



Workshop Manual

Fox 2010 ➤

Fox 2014 ➤

SpaceFox 2011 ➤

Heating, air conditioning

Edition 04.2015



List of Workshop Manual Repair Groups

Repair Group

80 - Heating

87 - Air conditioning system



Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.



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80 – Heating

1 Heating - passenger compartment components

(VRL007989; Edition 04.2015)



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ⇒ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery.



Note

- ◆ *Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.*
- ◆ *When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.*





1 - Demisting baffle

- ❑ Removal only with the instrument panel removed ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation

2 - Side air baffles

- ❑ Remove and install ⇒ [page 6](#)

3 - Defogger nozzle

- ❑ Remove and install ⇒ [page 9](#)

4 - Right air duct

- ❑ For the right air baffle on the panel ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation

5 - Left air duct

- ❑ For the left air baffle on the panel ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation

6 - Air distributor for baffles

- ❑ Remove and install ⇒ [page 9](#)

7 - Front left air duct in the footwell

- ❑ Remove and install ⇒ [page 8](#)

8 - Middle air duct

- ❑ Remove and install ⇒ [page 9](#)

9 - Front right air duct for the footwell

- ❑ Remove and install ⇒ [page 9](#)

10 - Central air baffles

- ❑ Remove and install ⇒ [page 6](#)

11 - Sealing

- ❑ Note installation position ⇒ [page 3](#)
- ❑ Replace if damaged

12 - Air intake duct housing

13 - Control motor for natural air valve and recirculation valve - V154-

- ❑ For vehicles with air conditioning only
- ❑ Remove and install ⇒ [page 32](#)

14 - Fresh air blower - V2-

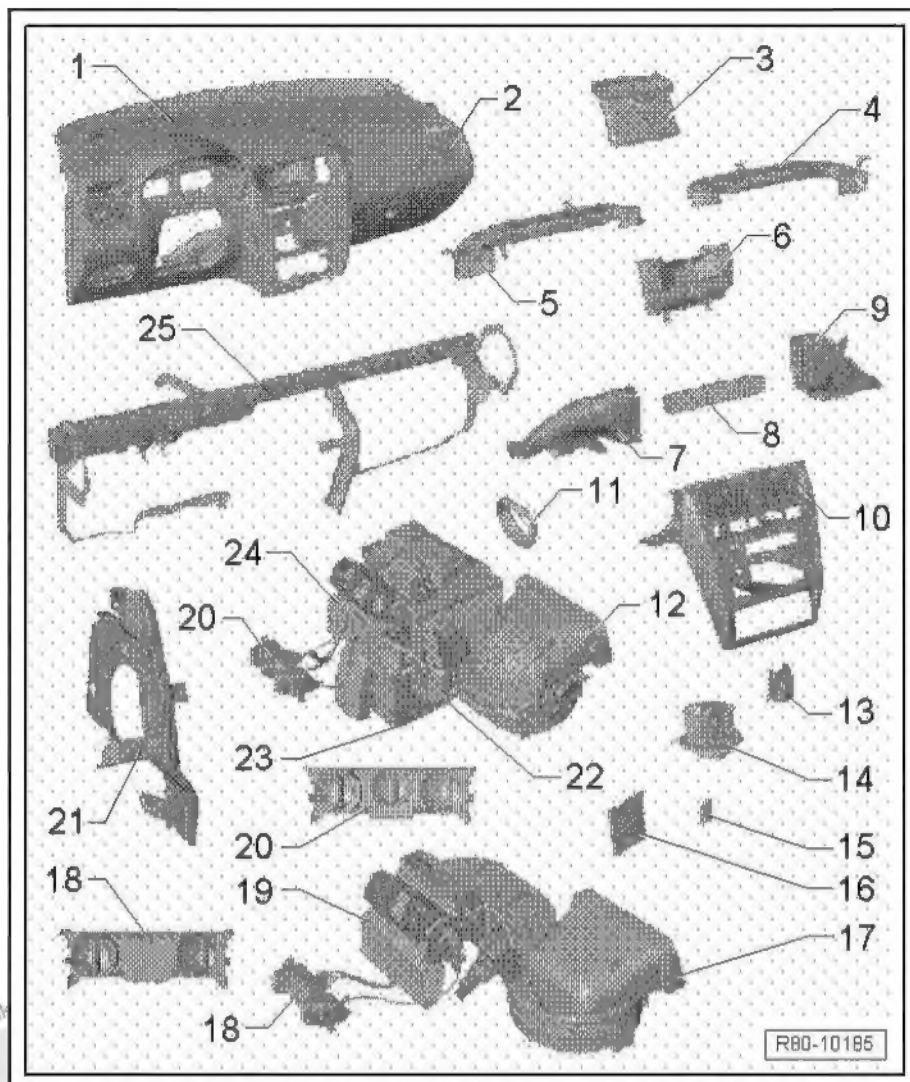
- ❑ Remove and install ⇒ [page 3](#)

15 - Fresh air blower pre-resistor with overheating cut-out - N24-

- ❑ Remove and install ⇒ [page 4](#)

16 - Dust and pollen filter

- ❑ Remove and install ⇒ [page 5](#)





17 - Air intake duct housing

18 - Ventilation adjustment mechanism

- ❑ Remove and install ➔ [page 14](#)

19 - Plenum chamber (ventilation)

- ❑ Remove and install ➔ [page 37](#)

20 - Ventilation adjustment mechanism

- ❑ Remove and install ➔ [page 14](#)

21 - Cross member left mounting

- ❑ Remove and install ➔ General body repairs, interior; Rep. gr. 70 ; Lining / insulation

22 - Dust and pollen filter compartment

23 - Heat exchanger compartment

24 - Plenum chamber (heating)

- ❑ Remove and install ➔ [page 20](#)

25 - Cross member

- ❑ Remove and install ➔ General body repairs, interior; Rep. gr. 70 ; Lining / insulation

1.1 Heat exchanger/engine compartment partition panel sealing

For vehicles equipped with a ventilation / heating system.

Plenum chamber (heating) -1-.

Heat exchanger intake duct -2-.

Heat exchanger outlet duct -3-.

Heat exchanger sealing -4-.

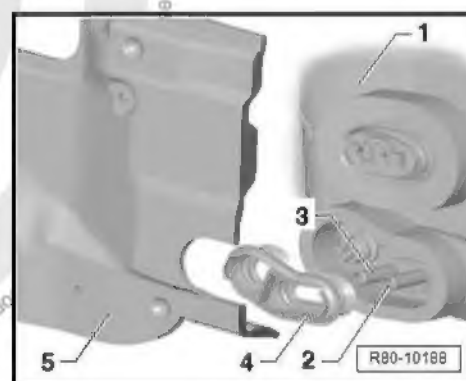
Engine compartment's partition panel -5-.

♦ Vehicles with Air Conditioning system ➔ [page 50](#) .



WARNING

Note the correct installation position for coolant input -2- and output -3- and output hoses on the heat exchanger.



1.2 Fresh air blower - V2-

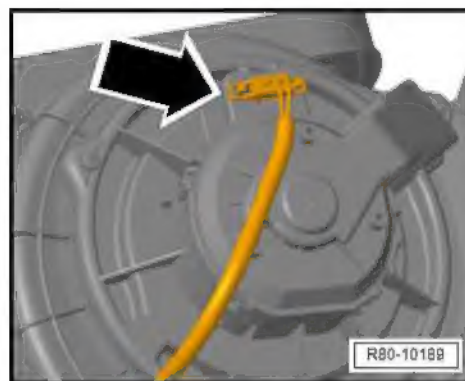
1.2.1 Fresh air fan - V2- - remove and install

Removal:

- Remove the glove compartment ➔ Body - Internal assembly works; Rep. gr. 70 ; Lining / insulation .



- Disconnect fan connector -arrow-.

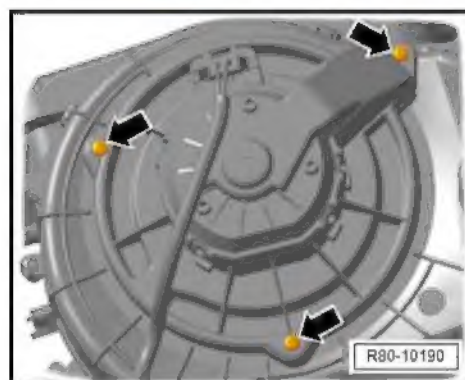


- Remove fastening screws -arrows- and remove the Fresh air fan - V2- from housing.

Installation:

Installation is performed in reverse sequence to the removal, observing the following:

- ◆ The Fresh air blower - V2- is different for the heater and air conditioning equipment - check the part number.
- ◆ The connector shall be connected correctly.
- ◆ Tighten fastening screws to a torque of (1 Nm).
- ◆ Check that the fan is in working order after installation.

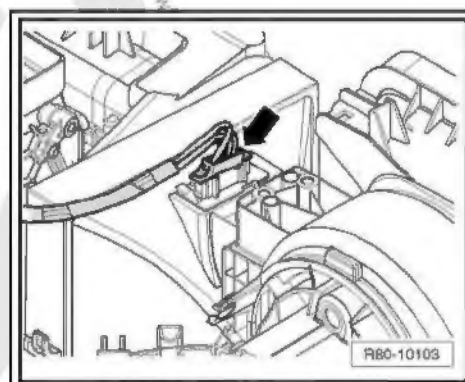


1.3 Fresh air blower pre-resistor with over-heating cut-out - N24-

1.3.1 Fresh air blower pre-resistance with overheating cut-out - N24- Plenum chamber (Valeo) - remove and install

Removal:

- Disconnect the earth wire of the battery ⇒ Electric equipment; Rep. gr. 27 ; Starter motor, alternator, battery
- Remove the glove box ⇒ Body - Internal assembly works; Rep. gr. 68 ; Internal equipment .
- Disconnect and release the connector -arrow- from the Pre-resistor of the fresh air blower with overheating cut-out - N24- .

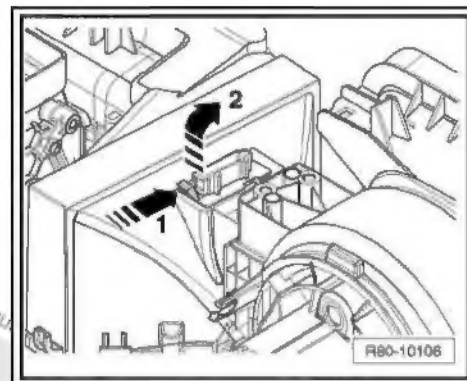




- Press the lock -arrow 1- for the Pre-resistor of the fresh air blower with overheating cut-out - N24- and remove by pulling it up -arrow 2-.

Installation:

Installation is performed in reverse sequence to the removal.



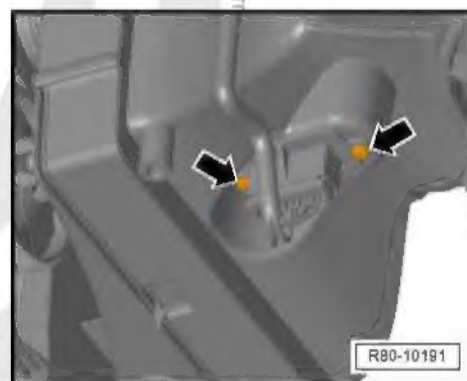
1.3.2 Pre-resistor of the fresh air blower with overheating cut-out - N24- Plenum chamber (Denso) - remove and install

Removal:

- Disconnect the earth wire of the battery ⇒ Electric equipment; Rep. gr. 27 ; Starter motor, alternator, battery
- Disengage the connector.
- Loosen fastening screws -arrows- and remove the Fresh air fan pre-resistor with overheating fuse - N24- .

Installation:

Installation is performed in reverse sequence to the removal.



1.4 Dust and pollen filter

1.4.1 Dust and pollen filter - remove and install



Note

The dust and pollen filter is located on the lower right side, under the dash panel.



Removal:

- Remove fastening screw -arrow- from the dust and pollen filter cover.



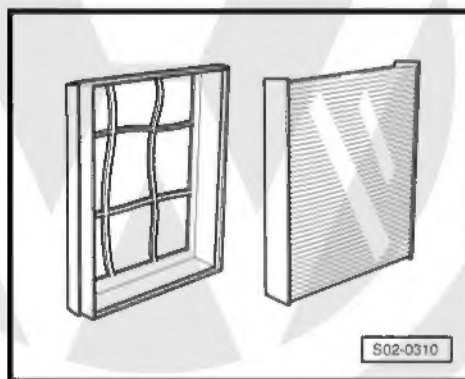
- Remove the dust and pollen filter -arrow-.



- Remove the filtering element from framework.

Installation:

Installation is performed in reverse sequence to the removal, observing the following:



- The pollen and dust filter should be assembled with the air flow directed as shown by the illustration.

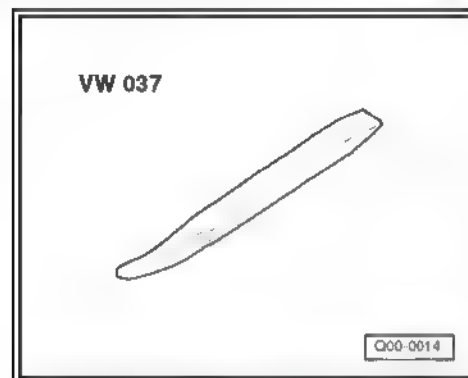


1.5 Air baffles

Special tools and workshop equipment required



◆ Scraper - VW 037- .



1.5.1 Air baffles (sides) - remove and install

Removal of air baffle (right side):

- Unslot the side cover (right side) from the instrument panel ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining/insulation , in order to gain access to the rear section of the air baffle.
- Carefully unslot and remove the air baffle (right side) with the Spatula - VW 037- .

Removal of air baffle (left side):

- Unslot the side cover (left side) from the instrument panel ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining/insulation , in order to gain access to the rear section of the air baffle.
- Remove the Combined instrument - K- ⇒ Electrical system; Rep. gr. 90 ; Instrument case, indicators .

- Carefully unslot and remove the air baffle (right side) with the Spatula - VW 037- .

Installation:

Installation is performed in reverse sequence to the removal.



1.5.2 Air baffle (central) - remove and install (version 1)



Note

Air baffles (central) are integrated on the centre frame of the instrument panel.

Removal:

- Remove the glove box ➤ General body repairs, interior; Rep. gr. 68 ; Internal equipment .



- Remove the Radio - R- or "CD player" - R89- from the instrument panel ➤ Communication; Rep. gr. 91 ; Radio equipment .
- Remove the switches from the instrument panel ➤ Electrical equipment; Rep. gr. 96 ; Switches, lights and internal lights, alarm .
- Remove the centre frame of the dash panel ➤ General body repairs, interior; Rep. gr. 70 ; Linings/insulations .

Installation:

Installation is performed in reverse sequence to the removal

1.5.3 Air baffle (central) - remove and install (version 2)

Removal:

- Remove the lower central frame of the instrument panel ➤ Body - Internal assembly work; Rep. gr. 70 ; Linings/insulations
- Remove the Radio - R- or "CD player" - R89- from the instrument panel ➤ Communication; Rep. gr. 91 ; Radio equipment .
- Remove the switches from the instrument panel ➤ Electrical equipment; Rep. gr. 96 ; Switches, lights and internal lights, alarm .
- Carefully unslot and remove the air baffle (central) with the Spatula - VW 037- .

Installation:

Installation is performed in reverse sequence to the removal.



1.6 Footwell air duct

1.6.1 Footwell flap (front left) - remove and install



Note

The footwell flap (front left) is located in the lower left side of the dash panel, near the brake and accelerator pedals.



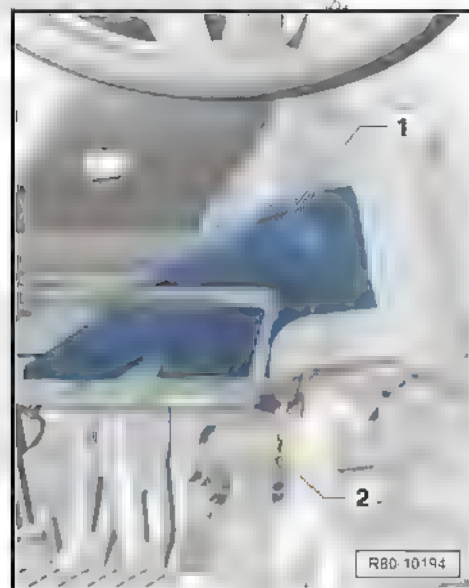
Removal:

- Remove the securing bolt -2-.
- Remove footwell air duct -1-.

Installation:

Installation is performed in reverse sequence to the removal, observing the following:

- Tighten securing bolt -2- to torque (15 Nm).



1.6.2 Footwell flap (front right) - remove and install



Note

The footwell flap (front right) is located on the lower right side of the dash panel, behind the glove box.

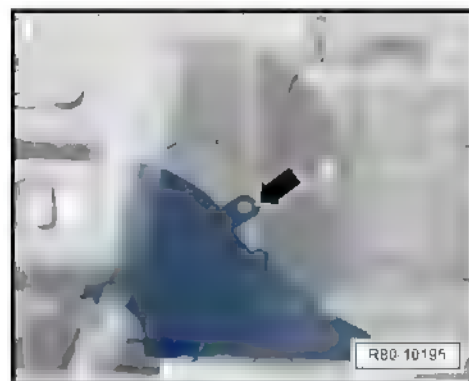
Removal:

- Remove the glove compartment on the passenger side ⇒ Body - Internal assembly work; Rep. gr. 68 ; Internal equipment .
- Remove the securing bolt -arrow-.
- Remove footwell flap.

Installation:

Installation is performed in reverse sequence to the removal, observing the following:

- Tighten the securing bolt -arrow- to (1.5 Nm) of torque.



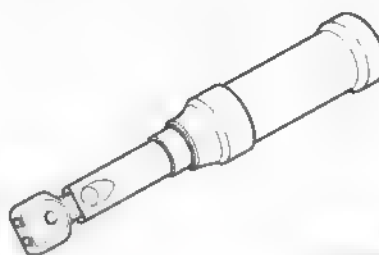
1.7 Demister nozzle and air distributor for central baffles

Special tools and workshop equipment required



- ◆ Torque wrench 2 to 10 Nm - VAG 1783-

V.A.G 1783

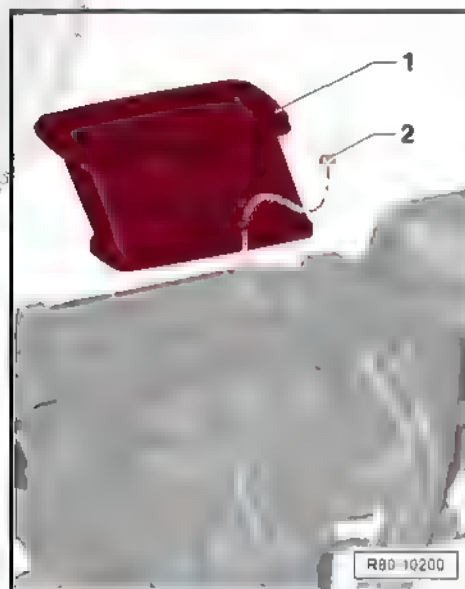


Q00 10085

17.1 Demister nozzle and air distributor for centre vents - remove and install

Removal:

- Remove the dash panel ⇒ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Remove the hex nut -2- and remove the demister nozzle -1-.
- Unslot and carefully remove the intermediate duct of the air baffles -3-.



- Loosen fastening screws -2-.
- Remove the air distributor to the baffles -1-.

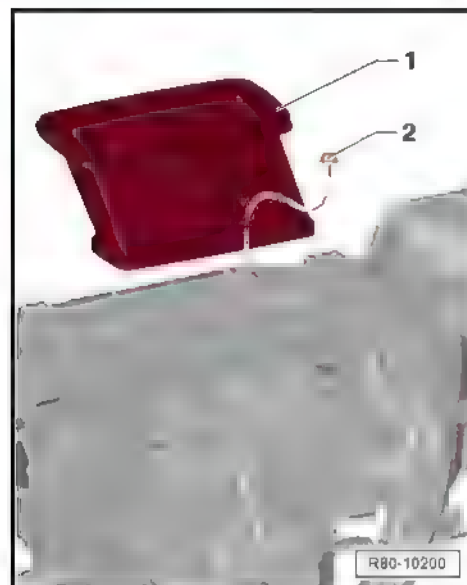
Installation:

Installation is performed in reverse sequence to the removal, observing the following:





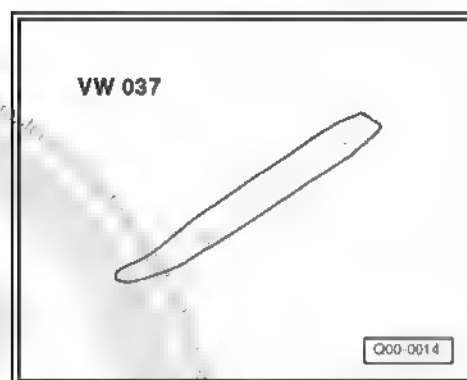
- Tighten the hex nut -2- with (4.5 Nm) of torque.



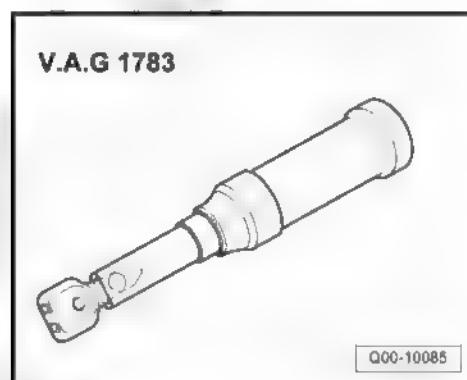
1.8 Fresh air intake nozzle

Special tools and workshop equipment required

- ◆ Scraper - VW 037- .



- ◆ Torque wrench 2 to 10 Nm - VAG 1783-



1.8.1 Fresh air intake nozzle cover - remove and install

Removal:

- Remove the upper bulkhead ➔ General body repairs, exterior;
Rep. gr. 50 ; Body - Front section .



- Remove the fastening bolts -arrows- of the air intake nozzle cover -1-
- Remove the fresh air intake nozzle cover.

Installation:

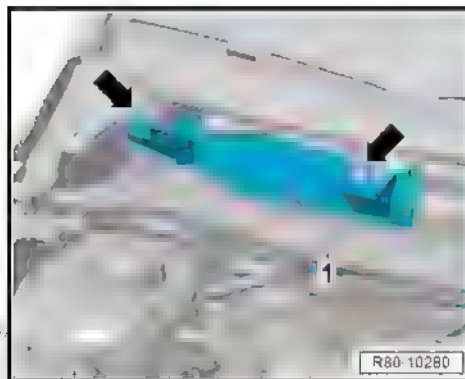
Installation is performed in reverse sequence to the removal, observing the following:

- Tighten fastening screws to a torque of (3 Nm).



Note

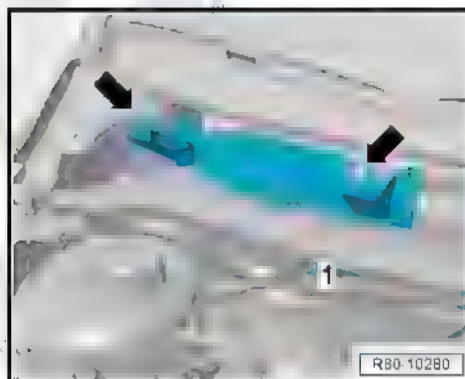
If the cover is incorrectly installed or damaged, water intake through the nozzle may cause customer complaints due to foul odours coming from the heating / air conditioning equipment or humidity inside the vehicle.



1.8.2 Fresh air intake nozzle grille - remove and install

Removal:

- Remove the lower windscreen lining ⇒ Body - External assembly works; Rep. gr. 66 ; External equipment
- Remove the fastening bolts -arrows- of the fresh air intake nozzle cover -1-



- Move the intake nozzle cover aside and remove the grille with the Spatula - VW 037-

Installation:

Installation is performed in reverse sequence to the removal, observing the following:

- Tighten fastening screws to a torque of (3 Nm).





1.9 Exhaust valve

Saturated air leaves exhaust valve openings -2- located on the rear panel, under the bumper.

For the ventilation system to work perfectly, these exhaust openings must not be clogged.

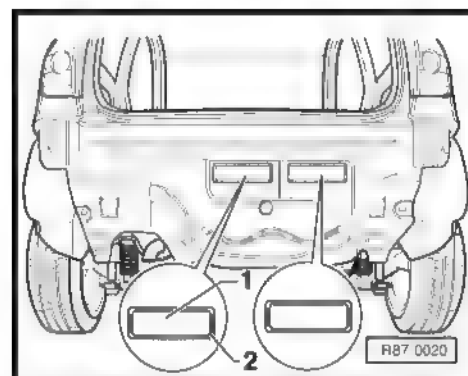
Exhaust openings have a cover -1- which opens and closes automatically

- Check operation of exhaust opening covers, and replace them as required.



Note

To remove exhaust valves, do not remove rear bumper.



1.9.1 Exhaust valve (Space) - remove and install

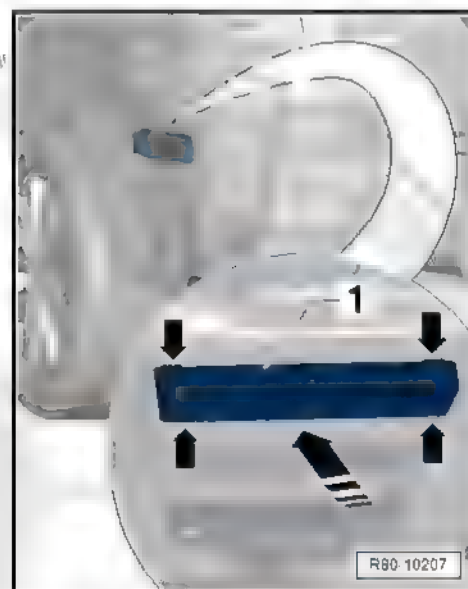
Removal:

- Remove the lower cover of the rear panel ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation .
- Press locks -arrows- and carefully move the exhaust valve -1- in direction of the -arrow-.



Note

The exhaust valves are located at both sides of the vehicle.

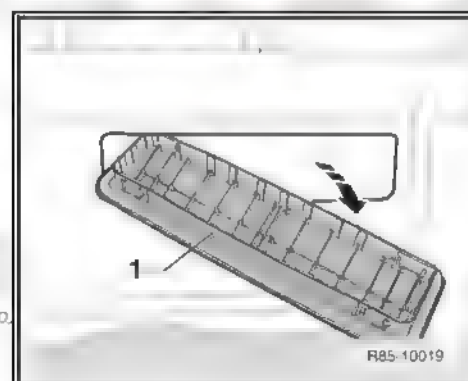


- Move the exhaust valve -1- in the direction of the -arrow- and remove it from the luggage compartment side.
- Remove the rear bumper ⇒ Bumper; Rep. gr. 63 ; Rear bumper - hatch .

Installation:

Installation is performed in reverse sequence to the removal.

- Install the rear bumper ⇒ Bumper; Rep. gr. 63 ; Rear bumper - hatch .

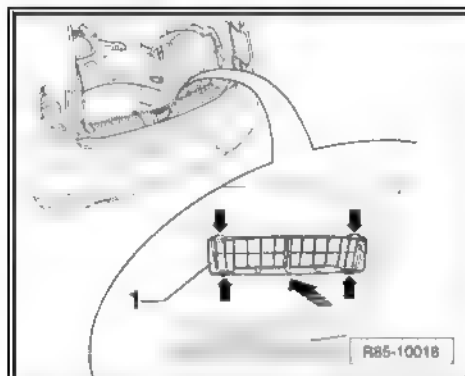




1.9.2 Exhaust valve - remove and install

Removal:

- Remove the lower cover of the rear panel ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation .
- Press locks -arrows- and carefully move the exhaust valve -1- in direction of the -arrow-.

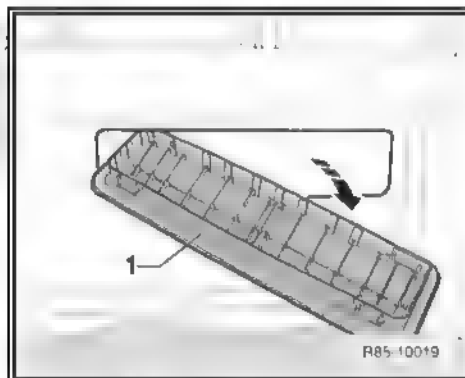


- Move the exhaust valve -1- in the direction of the -arrow- and remove it from the luggage compartment side.
- Remove the rear bumper ⇒ Bumper; Rep. gr. 63 ; Rear bumper - hatch .

Installation:

Installation is performed in reverse sequence to the removal.

- Install the rear bumper ⇒ Bumper; Rep. gr. 63 ; Rear bumper - hatch .



1.10 Ventilation adjustment mechanisms

1.10.1 Ventilation adjustment mechanism - remove and install

Ventilation adjustment mechanism, heating and air conditioning.

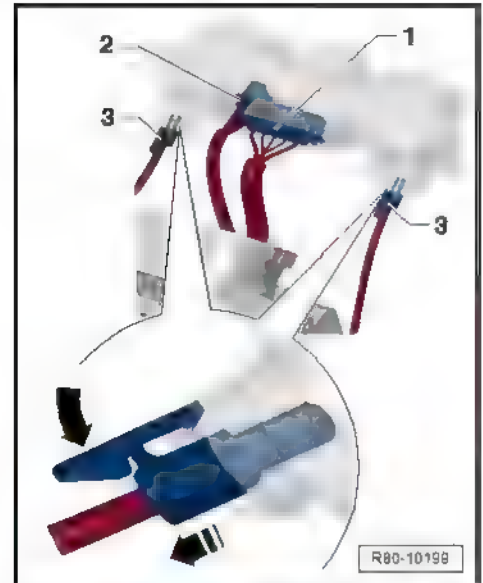
Removal:

- Remove the Radio - R- or "CD player" - R89- from the instrument panel ⇒ Communication; Rep. gr. 91 ; Radio, telephone, navigation system .
- Remove the centre frame of the dash panel ⇒ General body repairs, interior; Rep. gr. 70 ; Linings/insulations .
- Carefully remove the frame from the ventilation adjustment mechanism -1-, using the Spatula - VW 037- .
- Disconnect the connectors -1 and 2- from the from the ventilation adjustment mechanism





- Press the locks and remove the command cables -3- in the direction -arrow-.



- Remove fastening screws -1-.
- Remove ventilation adjustment mechanism -2-.

Installation:

Installation is performed in reverse sequence to the removal, observing the following:

- Tighten fastening screws -1- of ventilation adjustment mechanism to a torque of (1.5 Nm).



Note

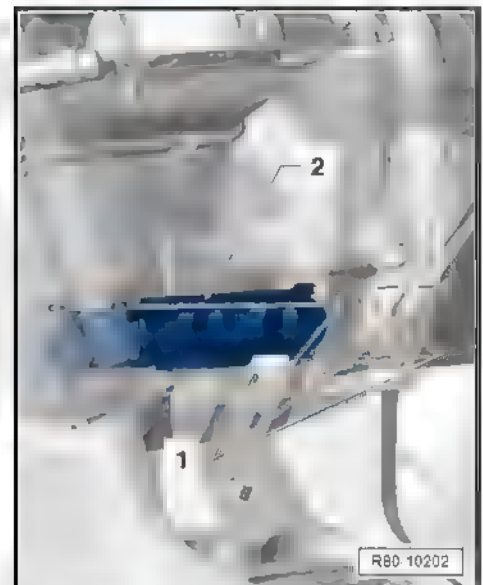
When installing command cables in the ventilation adjustment mechanism, observe thoroughly the following installation orders for individual cables:

Temperature command cable:

- Turn temperature adjustment command cable all the way to the right, adjust command button for temperature adjustment all the way to the left, and connect the cable.

Air distribution command cable:

- Position the air distribution command button to the demister and with the air ventilation on, turn the command cable until full ventilation to the demister (windscreen) is obtained and then connect it.



1.10.2 Ventilation adjustment mechanism power connectors

For vehicles with Ventilation system.

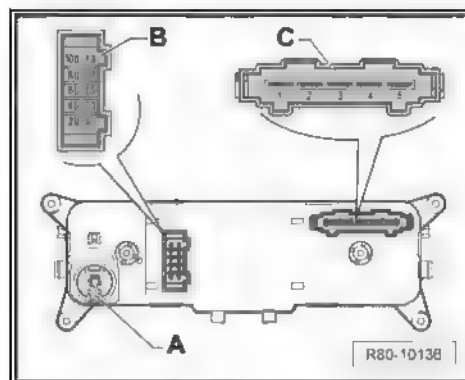
- ◆ Vehicles with Heating system → [page 16](#) .
- ◆ Vehicles with Air Conditioning system → [page 43](#) .



Remove and install ventilation control unit → [page 14](#) .

Position of the connectors in the rear section of the ventilation adjustment mechanism:

- A- Air distribution command cable
- B- Housing for 10-pole supply connector.
- 5- Terminal 31.
- 9- Terminal 58s.
- C- Housing for 5-pole supply connector.
- 1- 4th Ventilation speed.
- 2- 3rd Ventilation speed.
- 3- 2nd Ventilation speed.
- 4- 1st Ventilation speed.
- 5- Terminal -X- contact.



Note

Connector pins in the ventilation / heating adjustment mechanisms can also be found in the electrical diagrams → Current flow diagrams, Electrical fault finding and Fitting locations.

1.10.3 Ventilation / heating adjustment mechanism power connectors

For vehicles equipped with Heating system.

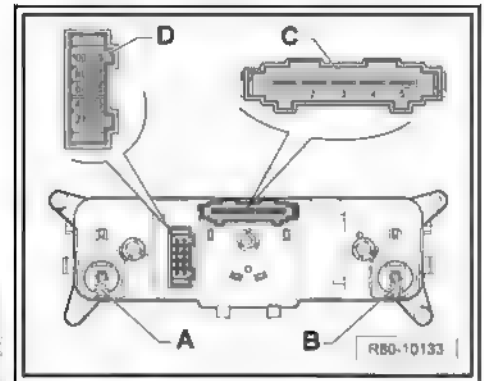
- ◆ Vehicles with Ventilation system ⇒ [page 15](#) .
- ◆ Vehicles with Air Conditioning system ⇒ [page 43](#) .



Remove and install ventilation control unit ➤ [page 14](#) .

Position of the connectors in the rear section of the ventilation / heating adjustment mechanism:

- A- Air distribution command cable
- B- Temperature adjustment command cable.
- C- Housing for 5-pole supply connector.
- 1- 4th Ventilation speed.
- 2- 3rd Ventilation speed.
- 3- 2nd Ventilation speed.
- 4- 1st Ventilation speed.
- 5- Terminal -X- contact.
- D- Housing for 10-pole supply connector.
- 5- Terminal 31.
- 9- Terminal 58s.



Connector pins in the ventilation adjustment mechanisms can also be found in the electrical diagrams ➤ Current flow diagrams, Electrical fault finding and Fitting locations.

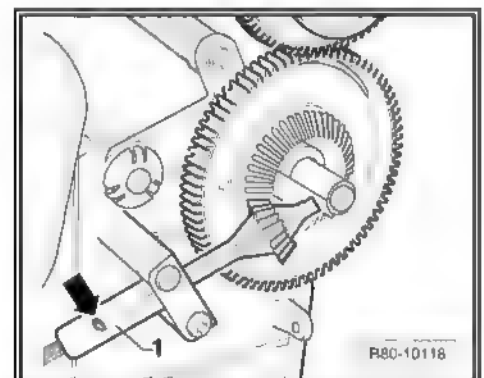
1.11 Command cables

1.11.1 Command cables (heating and air conditioning system) - remove and install

For vehicles with a heating / air conditioning system:

Removal:

- Remove the Radio - R- or "CD player" - R89- from the instrument panel ➤ Communication; Rep. gr. 91 ; Radio, telephone, navigation system .
- Remove the lower centre frame ➤ Body - Internal assembly works; Rep. gr. 70 ; Lining / insulation
- Remove ventilation adjustment mechanism ➤ [page 14](#) .
- Press slotting lock with a screwdriver -arrow- and remove the air distribution command cable -1-.





- Press the slotting lock with a screwdriver -arrow- and remove the temperature adjustment command cable -1-.

Installation:

Installation is performed in reverse sequence to the removal, observing the following:



Note

When installing command cables in the ventilation adjustment mechanism, observe thoroughly the following installation orders for individual cables:

Temperature command cable:

- Turn temperature adjustment command cable all the way to the right, adjust command button for temperature adjustment all the way to the left, and connect the cable.

Air distribution command cable:

- Position the air distribution command button to the demister and with the air ventilation on, turn the command cable until full ventilation to the demister (windscreen) is obtained and then connect it.

Checking ventilation system operation:

The ventilation adjustment mechanism command cable is correctly installed when in the "Defrost" or windscreen demist position, no air leaves the footwell flaps.

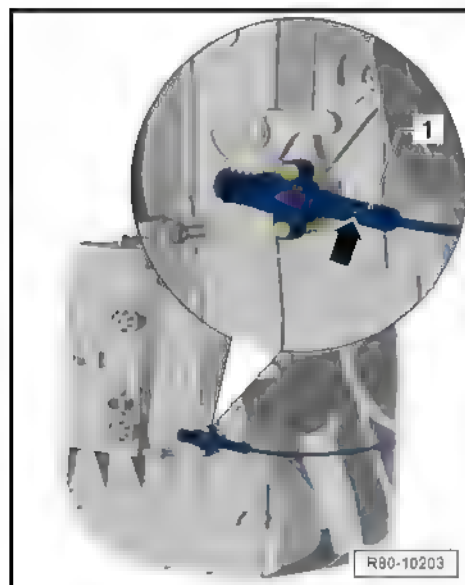
If this does not occur, turn the drive button by half-turn (180°) and reinstall the control cable.

1.11.2 Command cables (ventilation system) - remove and install

For vehicles equipped with ventilation system.

Removal:

- Remove the Radio - R- or "CD player" - R89- from the instrument panel ⇒ Communication; Rep. gr. 91 ; Radio, telephone, navigation system .
- Remove the centre frame of the dash panel ⇒ General body repairs, interior; Rep. gr. 70 ; Linings/insulations .
- Remove ventilation adjustment mechanism ⇒ [page 14](#) .





- Press slotting lock with a screwdriver -arrow- and remove the air distribution command cable -1-

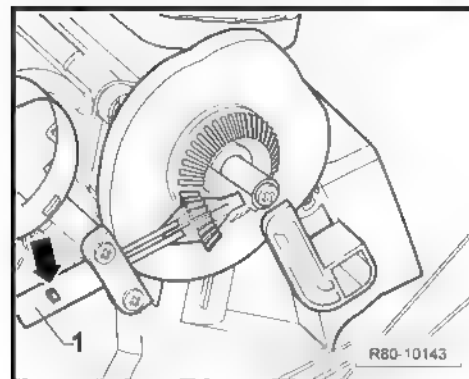
Installation:

Installation is performed in reverse sequence to the removal, observing the following.



Note

When installing command cables in the ventilation adjustment mechanism, observe thoroughly the following installation orders for individual cables:



Air distribution command cable:

- Position the air distribution command button to the demister and with the air ventilation on, turn the command cable until full ventilation to the demister (windscreen) is obtained and then connect it.

Checking ventilation system operation:

Ventilation adjustment mechanism command cable is correctly installed when, in the windscreen position, no air leaves the footwell air ducts.

If this does not occur, turn the drive button by half-turn (180°) and reinstall the control cable.



2 Plenum chamber (ventilation and heating) - remove and install



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A → Electrical equipment; Rep. gr. 27, Starter motor, alternator, battery.


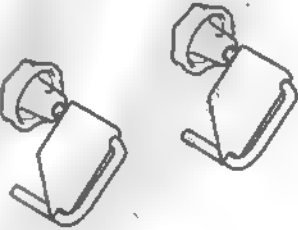
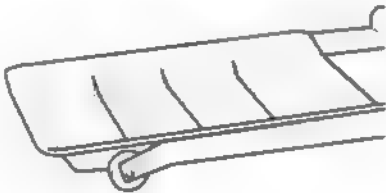
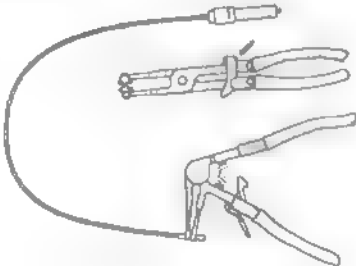
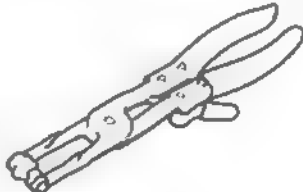


Note

- ◆ Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.
- ◆ When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.

Special tools and workshop equipment required

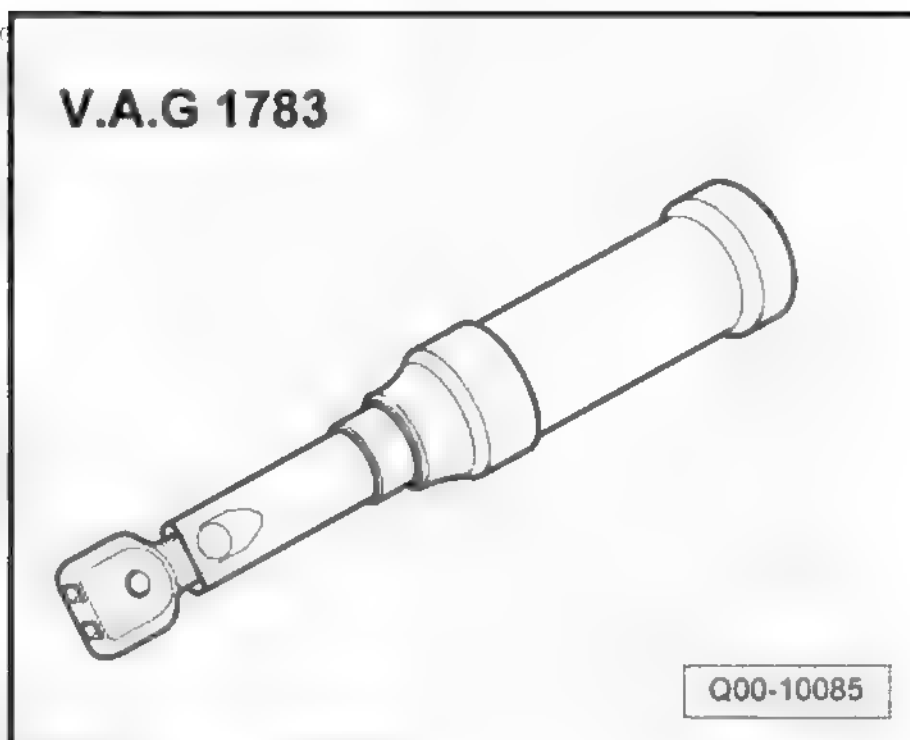
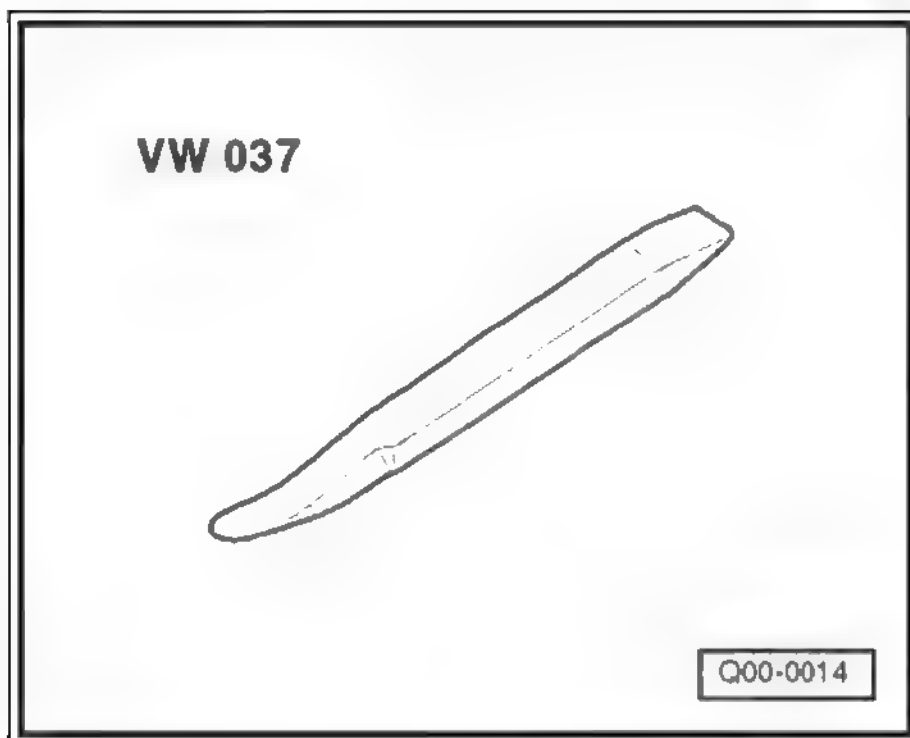
- ◆ Torque wrench - 5 to 50 Nm (enc. 1/2") - VAG 1331-
- ◆ Clamps (diameter 25 mm) - 3094-
- ◆ Oil collecting tray - VAG 1306-
- ◆ Standart-type clamp pliers - VW 5162 ou VAS 5024A-
- ◆ Standart-type clamp pliers - VW 5163-

VAG 1331 	3094 
VAG 1306 	VAS 5024A 
VW 5163 	

QB7-10005



◆ Spatula - VW 037-



Torque wrench 2 to 10 Nm - VAG 1783-



2.1 Plenum chamber - remove and install

1 - Cross member

- ❑ Remove and install ➤
Body - Internal assembly works; Rep. gr. 70 ;
Lining / insulation .

2 - Heat exchanger sealing

- ❑ Note installation position ➤ [page 50](#)
- ❑ Replace if damaged

3 - Screws

- ❑ 2 units
- ❑ 12 ± 1.2 Nm

4 - Dust and pollen filter compartment

- ❑ Dust and pollen filter -
remove and install
➤ [page 5](#)

5 - Heat exchanger compartment

- ❑ Heat exchanger -
remove and install
➤ [page 33](#)

6 - Air distribution command cable

- ❑ Remove and install
➤ [page 17](#)

7 - Cross member left mounting

- ❑ Remove and install ➤
General body repairs,
interior; Rep. gr. 70 ;
Lining / insulation

8 - Screws

- ❑ 4 units
- ❑ 12 ± 1.2 Nm

9 - Screws

- ❑ 2 units
- ❑ 12 Nm

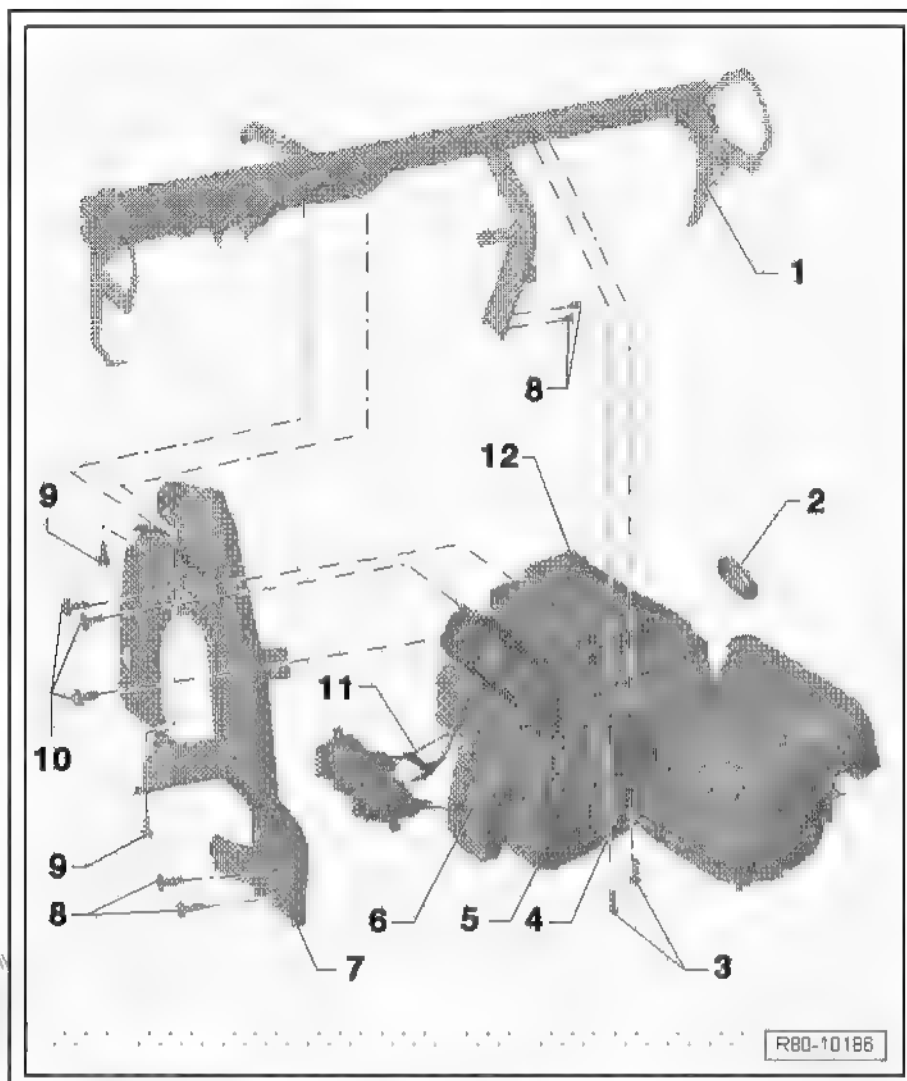
10 - Screws

- ❑ 3 units
- ❑ 9 ± 0.5 Nm

11 - Temperature command cable

- ❑ Remove and install ➤ [page 17](#)

12 - Evaporator compartment



2.1.1 Removal



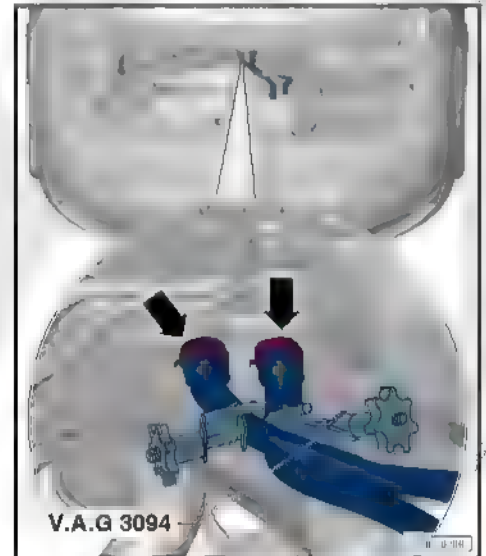
WARNING

Risk of burns!

*With hot engine, the coolant temperature may be over 100°C.
The cooling system is pressurized.*

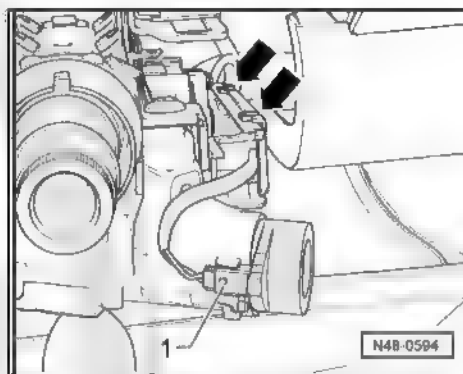
Before starting any work, reduce pressure and temperature, if required.

- Close the coolant hoses in engine compartment by using the Clamps (diam. 25 mm) - 3094-
- Release the clamps -arrows- with the Standart-type clamp pliers - VW 5162 (VWB) - ou - VAS 5024A- and remove the hoses.
- Install a hose on one of the heat exchanger outlets. At the other outlet, place a container to collect coolant.
- Use a compressed air pistol to remove the coolant from the heat exchanger.
- Turn off the ignition and all electrical equipment, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ Electrical devices; Rep. gr. 27 ; Starter motor, alternator, battery .
- Remove the Combined instrument - K- ⇒ Electrical system; Rep. gr. 90 ; Instrument case, indicators .
- Remove the Radio - R- or "CD player" - R89- from the instrument panel ⇒ Communication; Rep. gr. 91 ; Radio equipment .
- Remove the switches from the instrument panel ⇒ Electrical equipment; Rep. gr. 96 ; Switches, lights and internal lights, alarm .
- Remove the centre frame of the dash panel ⇒ General body repairs, interior; Rep. gr. 70 ; Linings/insulations .
- Remove ventilation adjustment mechanism ⇒ [page 14](#) .
- Remove the steering wheel ⇒ Chassis, axles, steering; Rep. gr. 48 ; Steering .
- Remove the steering column covering ⇒ General body repairs, interior; Rep. gr. 70 ; Lining / Insulation .
- Remove the turn signal and wiper/washer switches⇒ Electrical system; Rep. gr. 94 ; Switches, lights, and external lamps .
- Disconnect the connector -1- from the Immobilizer reading coil - D2- .

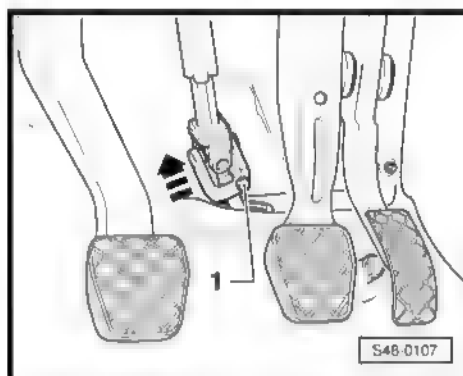
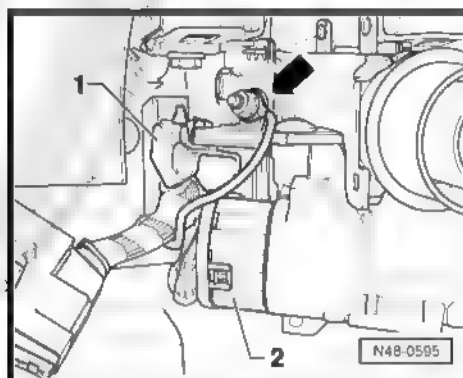




- Open the support (right side) of the cables on the tabs -arrows- and remove the cable.
- Disconnect the earth strap from the steering column -arrow-.



- Remove the earth strap and the support (left side) from the cables -1- in the switchbox.
- Disconnect the Ignition switch - D- -2- into the steering lock set.
- Remove the dash panel ⇒ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Remove demister nozzle and air distributor to the central baffles ⇒ [page 9](#).
- Remove footwell air duct (front left) ⇒ [page 8](#) .
- Remove footwell air duct (front right) ⇒ [page 9](#) .
- Remove the fastening screw -1- from the universal joint and unhook the universal joint in the direction -arrow- ⇒ Chassis, axels, steering ; Rep. gr. 48 ; Steering .
- Release fastening screws at left -A- and right -B- sides.





- Remove the cross member ⇒ Body - Internal assembly works; Rep. gr. 70 ; Lining/insulation .
- Remove the supports (right and left) from the dash support ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation .
- Carefully separate the plenum chamber from the panel and disconnect the connectors from the plenum chamber.
- Remove the plenum chamber.

2.1.2 Installation

Installation is performed in reverse sequence to the removal, observing the following:

- Mount harnesses and all the connectors in their original positions.



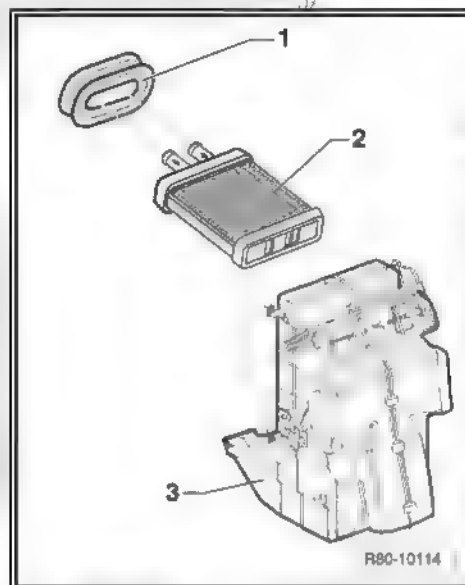
- Observe installation position of seal -1- and of heat exchanger hoses -2- ➔ [page 3](#) .



Note

After removal or replacement of heat exchanger, the cooling system will have air; to remove the air, proceed as follows.

- Start the engine and keep it at 2500 rpm speed until coolant level in tank lowers due to opening of thermostat valve (the air that was in the heat exchanger is moved to the coolant tank , causing coolant level there to decrease).
- Replenish the coolant tank level ➔ Engine; Rep. gr. 19 ; Cooling system .





3 Plenum chamber (ventilation and heating) - remove and install



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ➔ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery.

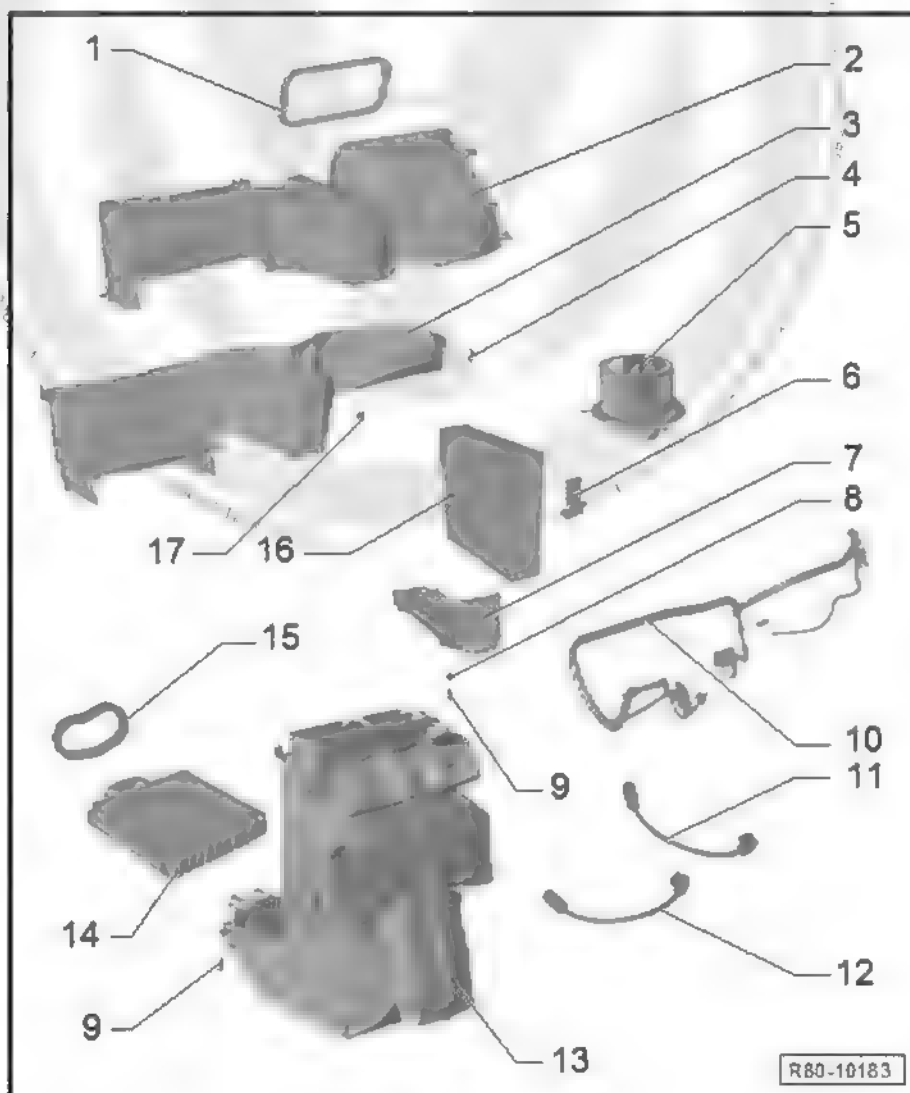


Note

- ◆ Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.
- ◆ When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.

3.1 Plenum chamber (ventilation and heating) - general overview of assembly

- 1 - Sealing
 - ☐ Replace if damaged
- 2 - Plenum chamber top section
- 3 - Plenum chamber bottom section
- 4 - Clip
 - ☐ Replace if damaged
- 5 - Fresh air blower - V2-
 - ☐ Remove and install
➔ [page 3](#)
- 6 - Fresh air blower pre-resistance with overheating cut-out - N24-
 - ☐ Remove and install
➔ [page 4](#)
- 7 - Dust and pollen filter cover
- 8 - Bushing
- 9 - Screw
 - ☐ 1.5 Nm
- 10 - Electrical conductors (harness)
- 11 - Air distribution command cable
 - ☐ Remove and install
➔ [page 17](#)
- 12 - Temperature command cable
 - ☐ Remove and install
➔ [page 17](#)





13 - Plenum chamber

- ☐ Remove and install ➔ [page 20](#)

14 - Heat exchanger

- ☐ Remove and Install ➔ [page 33](#)

15 - Heat exchanger sealing

- ☐ Replace if damaged

16 - Dust and pollen filter

- ☐ Remove and install ➔ [page 5](#)

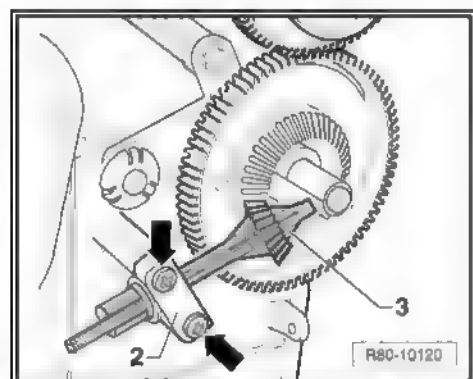
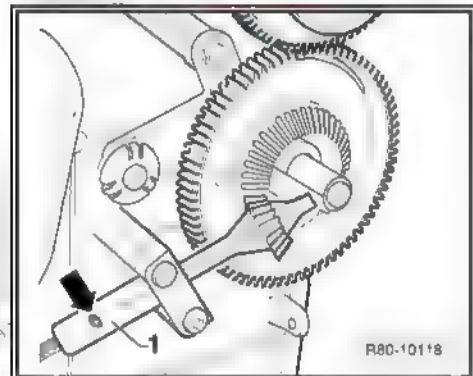
17 - Clip

- ☐ Replace if damaged

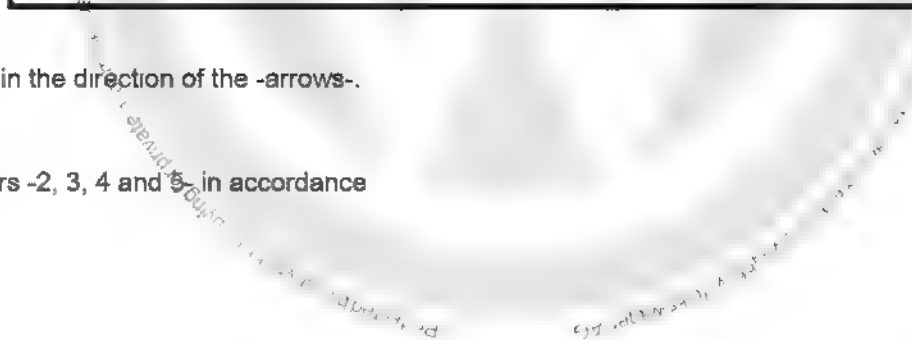
3.2 Air distribution operating mechanism - remove and install

3.2.1 Removal

- Remove plenum chamber ➔ [page 20](#) .
- Disassemble the upper part of the plenum chamber.
- Press the lock -arrow-, and remove the operating mechanism 1- cable.
- Loosen fastening screws -arrows-, disengage bearing 2- and remove distribution lever 3-



-
- Technical drawing showing a gear assembly. A key is shown being inserted into a shaft, which is connected to a gear. The drawing includes a detail view of the key and shaft connection, showing the key's profile and the shaft's diameter. The main drawing shows the gear assembly with the key and shaft. The drawing is labeled with the number 80-10123.



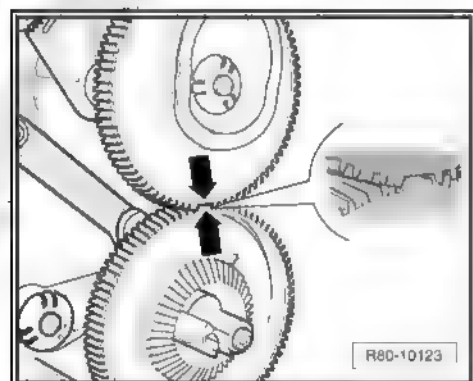
- ### 3.2.2 Installation

3. Plenum chamber (ventilation and heating) remove and install 29



- Position the gears of the operating mechanism so that markings/arrows- match up, one within the other.
- Assemble upper lever.
- After installation, check the operation of the adjustment mechanism.

All the small hatches must move freely; otherwise, remove the mechanism and repeat installation.

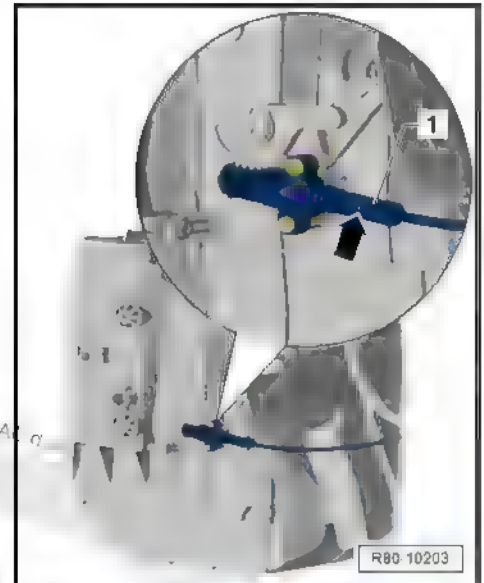


3.3 Temperature adjustment mechanism - remove and install

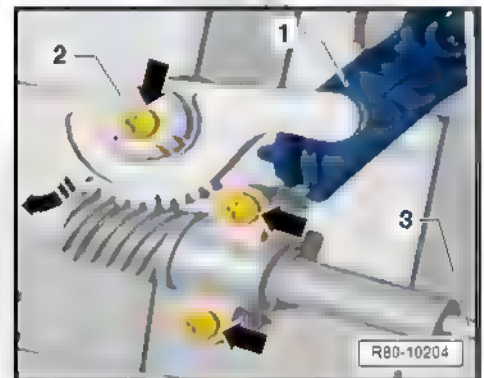
3.3.1 Removal

- Remove instrument panel ➤ Body - Internal assembly works;
Rep. gr. 70 ; Instrument panel - remove and install
- Remove front left footwell flap ➤ [page 8](#) .

- Press the lock -arrow-, and pull out the command cable -1- for the temperature adjustment mechanism.



- Mark position of the levers -1 and 2- with the temperature adjustment hatch in the fully closed position.
- Loosen fastening screws -arrows- and remove mechanisms -2 and 3- for temperature adjustment, in the direction of the -arrow-.



3.3.2 Installation

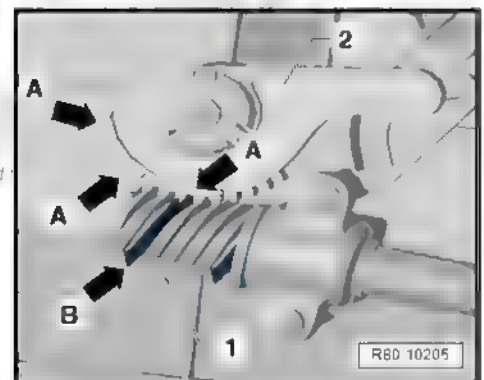
Installation is performed in reverse sequence to the removal, observing the following:



Note

- ◆ Before installing, check that the position of the worm gear -1- and gear segment -2- match each other.
- ◆ The larger thread (dark hatched area) -arrow A- shall fit into the deeper tooth intervals -arrow B-.
- Install adjustment mechanism -1 and 2 - with the small temperature adjustment hatch lever in fully closed position.
- After installation, check the operation of the adjustment mechanism.

All the small hatches must move freely; otherwise, remove the mechanism and repeat installation.

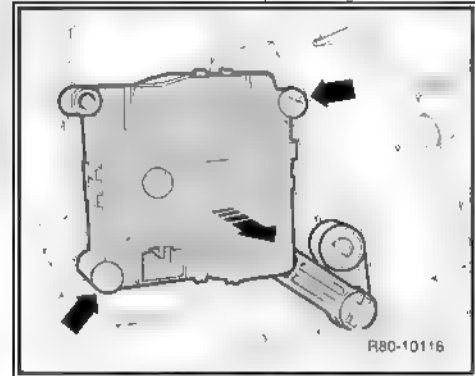




3.4 Control motor for fresh air valve and recirculation valve - V154- - remove and install

3.4.1 Removal

- Disconnect Control motor for natural air valve and recirculation valve - V154- connector
- Loosen the fastening screws -arrows-, and remove the Control motor for the natural air valve and recirculation valve - V154- in the direction of the -arrow-.



3.4.2 Installation

Installation is performed in reverse sequence to the removal, observing the following:



Note

A new Control motor for natural air valve and recirculation valve - V154- is supplied in the end position "air circulation operation".



4 Heat exchanger - remove and install



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ⇒ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery.



Note

- ◆ Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap
- ◆ When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.

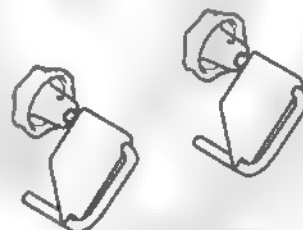
Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (enc. 1/2") - VAG 1331-
- ◆ Clamps (diameter 25 mm) - 3094-
- ◆ Oil collecting tray - VAG 1306-
- ◆ Standart-type clamp pliers - VW 5162 ou VAS 5024A-
- ◆ Standart-type clamp pliers - VW 5163-

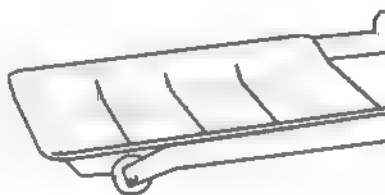
VAG 1331



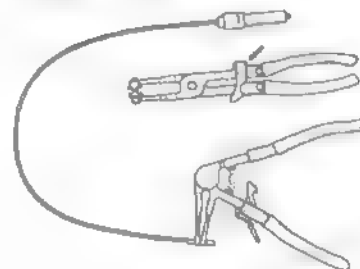
3094



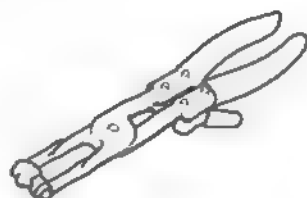
VAG 1306



VAS 5024A



VW 5163



Q87-10005



4.1 Heat exchanger - remove and install



WARNING

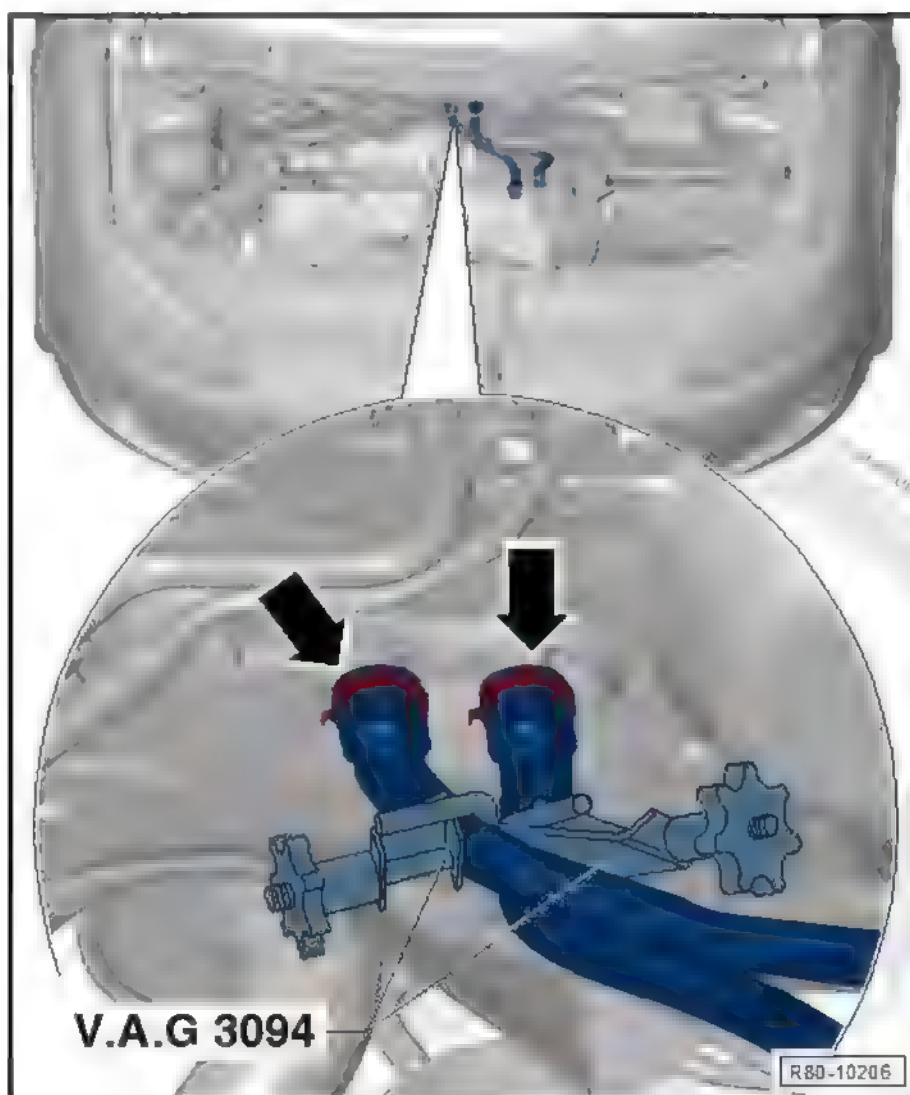
Risk of burns!

*With hot engine, the coolant temperature may be over 100°C.
The cooling system is pressurized.*

Before starting any work, reduce pressure and temperature, if required.

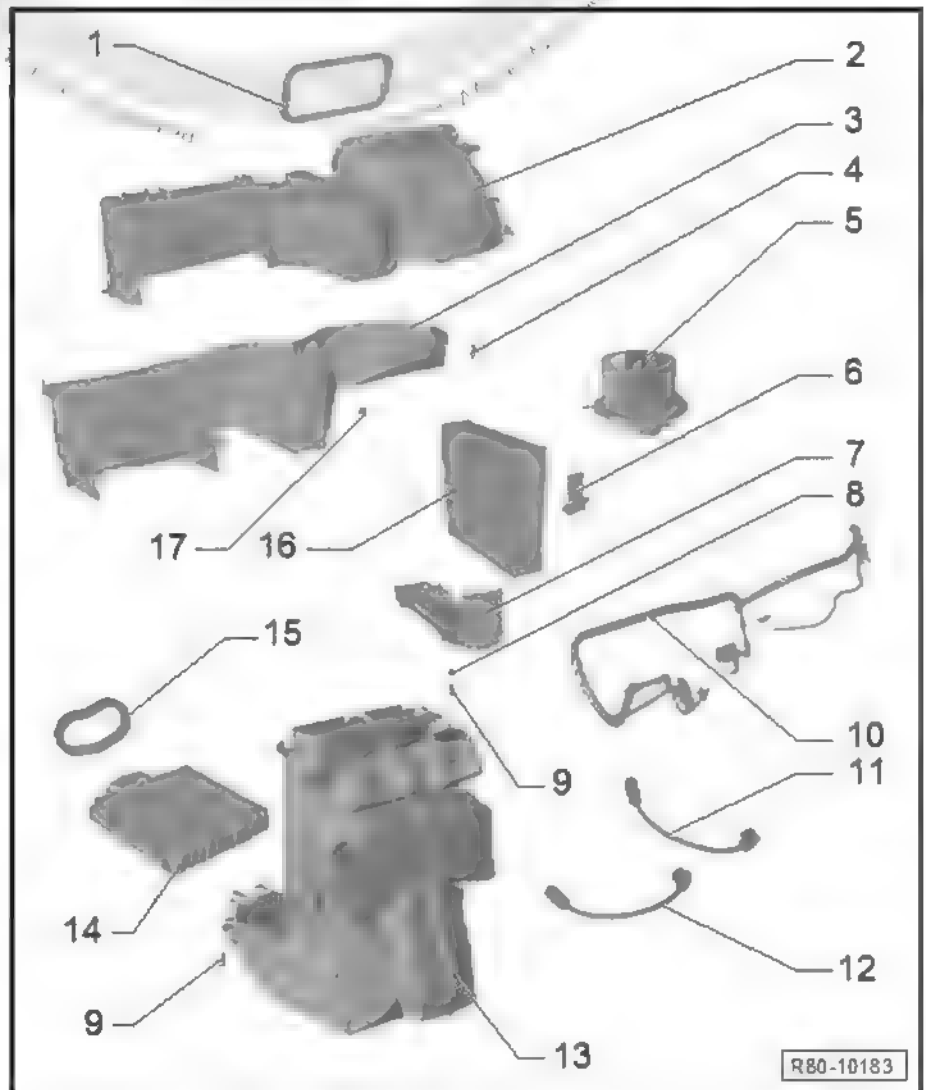
4.1.1 Removal

- Close the coolant hoses in engine compartment by using the Clamps (diam. 25 mm) - 3094-



- Release the clamps -arrows- with the Standard-type clamp pliers - VW 5162 (VWB) - ou - VAS 5024A- and remove the hoses.
- Install a compressed air hose on one of the heat exchanger outlets. At the other outlet, place a container to collect coolant.

- Use a compressed air pistol to remove the coolant from the heat exchanger.
- Remove expansion valve, if any ➔ [page 101](#).
- Remove the radio from dash panel ➔ Communication; Rep. gr. 91 ; Radio, telephone, navigation system .
- Remove the Combined instrument - K- ➔ Electrical system; Rep. gr. 90 ; Instrument case, indicators .
- Remove the dash panel ➔ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Remove the direct support for the panel bracket ➔ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Remove the remaining securing bolts.
- Move plenum chamber away from the panel support and release harnesses and connectors fastened to plenum chamber.
- Remove plenum chamber from its housing.
- Disassemble the upper and lower sections of the plenum chamber -2 and 3-





- Pull out the heat exchanger -14- from the plenum chamber -13-.

4.1.2 Installation

Installation is performed in reverse sequence to the removal, observing the following:



WARNING

Observe the correct assembly position of the heat exchanger with respect to the plenum chamber bottom section.

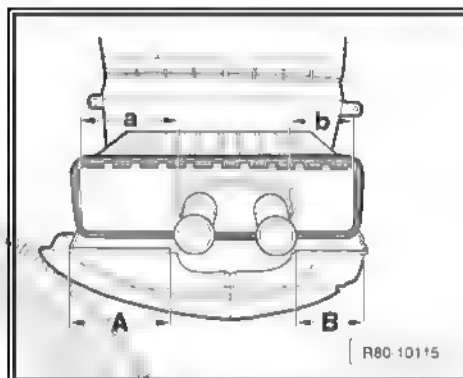
Assembly position for the heat exchanger:

- Position the heat exchanger in the plenum chamber bottom section so that marks -A- and -a- (larger) MATCH, and follow the same reference with marks -B- and -b- (smaller).



Note

The heat exchanger must be assembled correctly to prevent water infiltration into the vehicle.



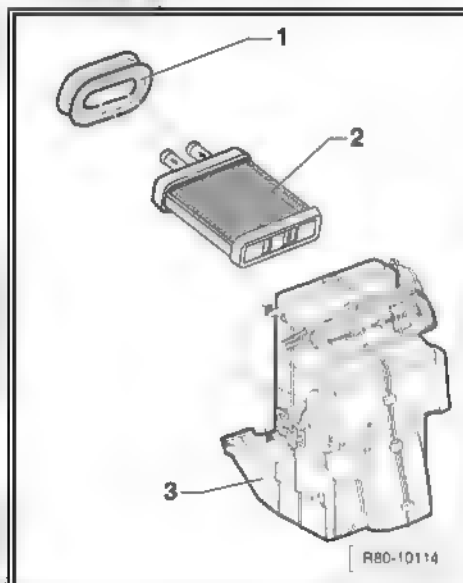
- Observe the installation position of the seal -1- and of the hoses on the heat exchanger -2- ⇒ [page 3](#) .



Note

After removal or replacement of heat exchanger, the cooling system will have air; to remove the air, proceed as follows:

- Start the engine and keep it at 2500 rpm speed until coolant level in tank lowers due to opening of thermostat valve (the air that was in the heat exchanger is moved to the coolant tank , causing coolant level there to decrease).
- Replenish the coolant tank level ⇒ Engine; Rep. gr. 19 ; Cooling system .





5 Plenum chamber (ventilation) - remove and install



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ➔ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery.



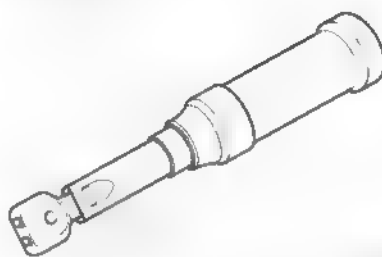
Note

- ◆ Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.
- ◆ When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.

Special tools and workshop equipment required

- ◆ Torque wrench 2 to 10 Nm - VAG 1783-

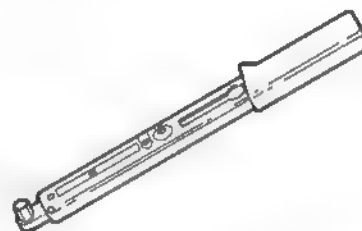
V.A.G 1783



Q00-10085

- ◆ Torque wrench - 5 to 50 Nm (enc. 1/2") - VAG 1331-

V.A.G 1331



Q00-10065

5.1 Plenum chamber (ventilation) - remove and install



1 - Cross member

- ☐ Remove and install ➔
Body - Internal assembly works; Rep. gr. 70 ;
Lining / insulation .

2 - Screws

- ☐ 2 units
- ☐ 12 ± 1.2 Nm

3 - Air distribution command cable

- ☐ Remove and install
⇒ [page 18](#)

4 - Cross member left mounting

- ☐ Remove and install ➔
General body repairs,
interior; Rep. gr. 70 ;
Lining / insulation

5 - Screws

- ☐ 4 units
- ☐ 12 ± 1.2 Nm

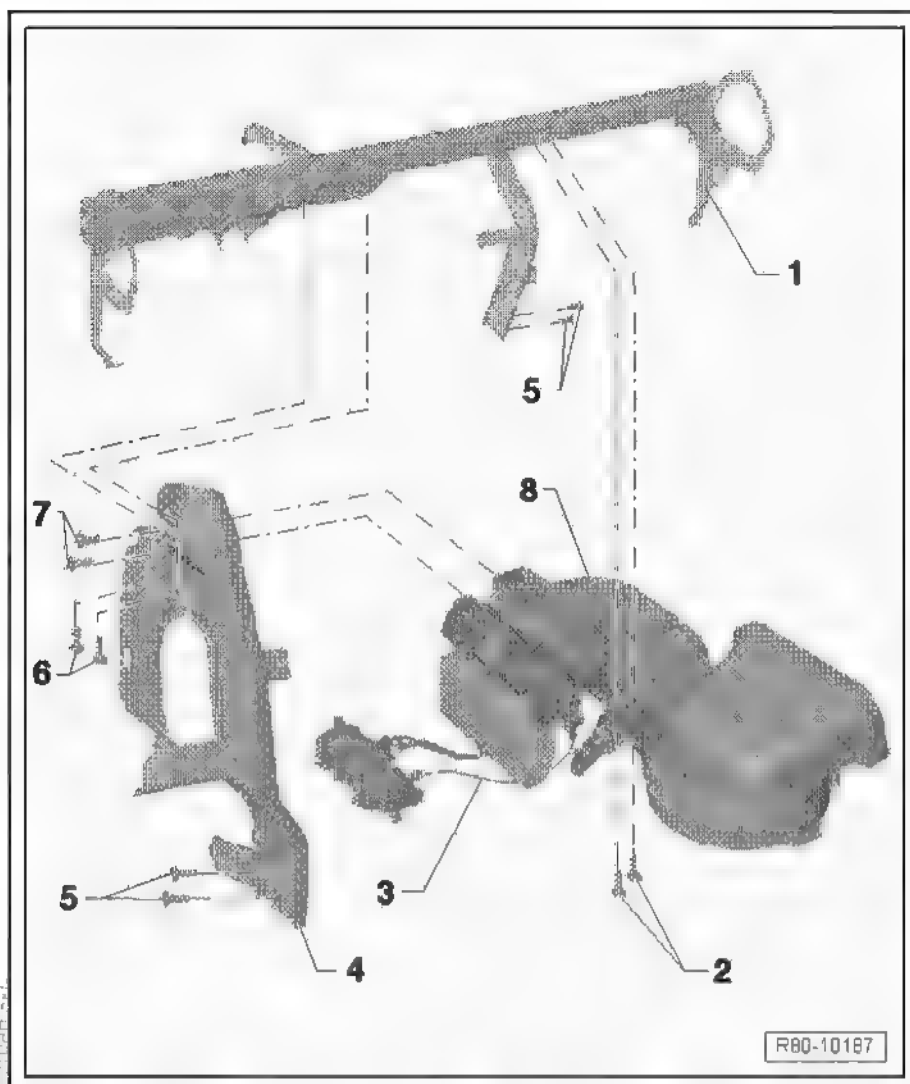
6 - Screws

- ☐ 2 units
- ☐ 12 Nm

7 - Screws

- ☐ 2 units
- ☐ 5 ± 0.5 Nm

8 - Plenum chamber (ventilation)

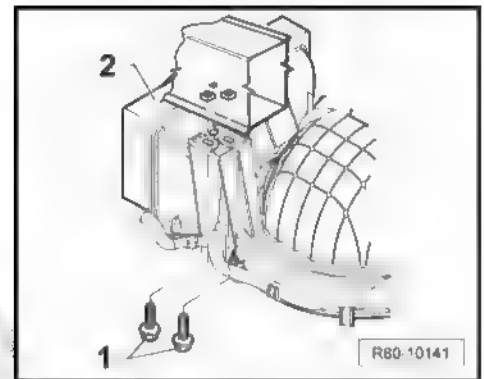


5.1.1 Removal

- Turn off the ignition and all electrical equipment, and remove the key from ignition.
- Disconnect the Battery - A- ➔ Electrical devices; Rep. gr. 27 ; Starter motor, alternator, battery .
- Remove the Combined instrument - K- ➔ Electrical system; Rep. gr. 90 ; Instrument case, indicators .
- Remove the Radio - R- or "CD player" - R80- from the instrument panel ➔ Communication; Rep. gr. 91 ; Radio equipment .
- Remove the switches from the instrument panel ➔ Electrical equipment; Rep. gr. 96 ; Switches, lights and internal lights, alarm .
- Remove the centre frame of the dash panel ➔ General body repairs, interior; Rep. gr. 70 ; Linings/insulations .
- Remove ventilation adjustment mechanism ➔ [page 14](#) .
- Remove the steering wheel ➔ Chassis, axles, steering; Rep. gr. 48 , Steering .
- Remove the steering column covering ➔ General body repairs, interior; Rep. gr. 70 ; Lining / Insulation .



- Remove the turn signal and wiper/washer switches ➤ Electrical system; Rep. gr. 94 ; Switches, lights, and external lamps .
- Remove the dash panel ➤ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Remove demister nozzle and air distributor to the central baffles ➤ [page 9](#) .
- Remove front left footwell air duct ➤ [page 8](#) .
- Remove footwell air duct (front right) ➤ [page 9](#) .
- Loosen the fastening screws -1- from the plenum chamber -2-.
- Remove the supports (right and left) from the dash support ➤ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation .
- Carefully separate the plenum chamber from the panel and disconnect the connectors from the plenum chamber.
- Remove the plenum chamber.



5.1.2 Installation

Installation is performed in reverse sequence to the removal, observing the following:

- 1. Mount harnesses and all the connectors in their original positions.



6 Plenum chamber (ventilation) - disassemble and assemble



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ➔ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery.



Note

- ◆ *Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.*
- ◆ *When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.*

6.1 Plenum chamber (ventilation) - general overview of assembly



Note

Only for vehicles with forced air ventilation system.





1 - Plenum chamber top section

2 - Sealing

☐ Replace if damaged

3 - Plenum chamber bottom section

4 - Clip

5 - Fresh air fan - V2-

☐ Remove and install
⇒ [page 3](#)

6 - Fresh air blower pre-resistance with overheating cut-out - N24-

☐ Remove and install
⇒ [page 4](#)

7 - Electrical conductors (harness)

8 - Air distribution command cable

☐ Remove and install
⇒ [page 18](#)

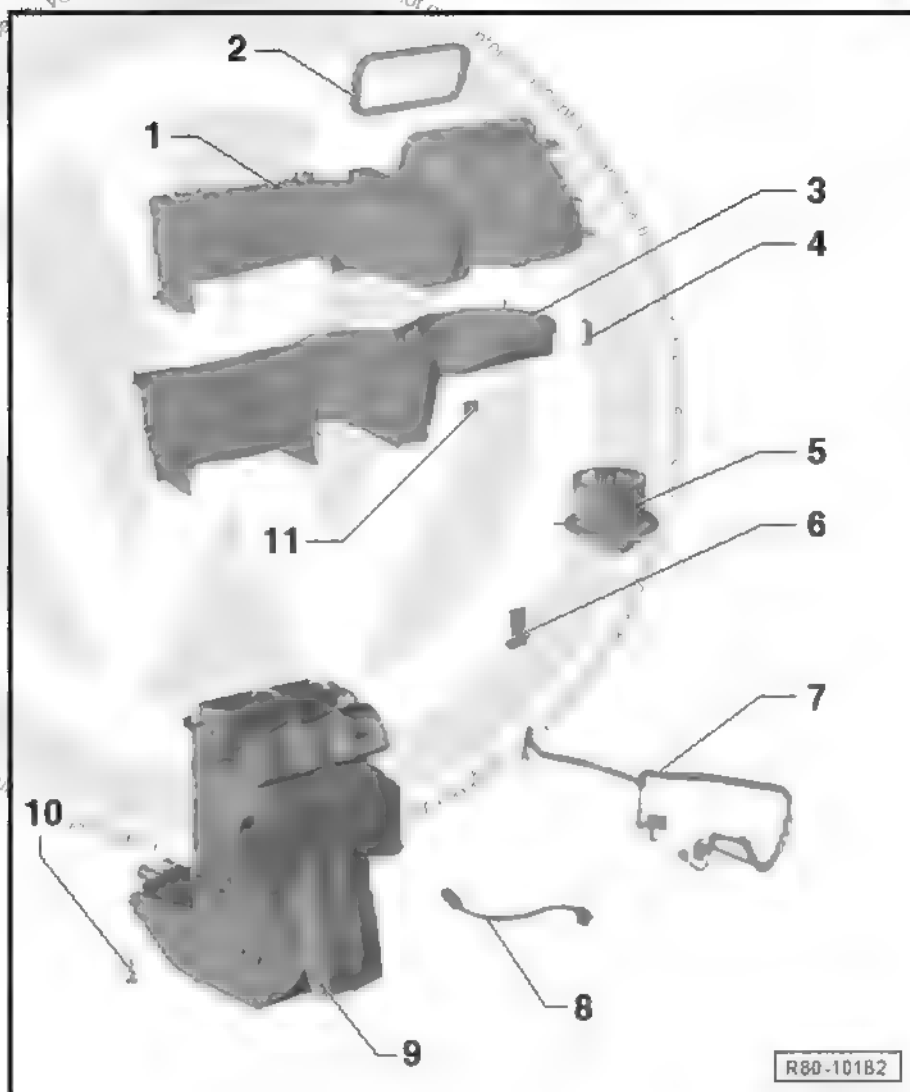
9 - Air distributor chamber

10 - Screw

☐ 1.5 Nm

11 - Clip

☐ Replace if damaged



R80-10182



87 – Air conditioning system

1 Notes on repairing vehicles with air conditioning system and on handling refrigerant

Additional information and safety measures related to R134a refrigerant ⇒ Air conditioning with R134a refrigerant; Rep. gr. 00 ; Technical data .

Other information:

- ◆ The current flow diagrams are found by selecting the Electric diagrams icon ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- ◆ Repairs to the refrigerant circuit must only be performed at authorized and specialized technical assistance workshops.
- ◆ A warning sign on the engine compartment lock support provides information about the refrigerant used and the filling capacity.



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ⇒ Electrical equipment; Rep. gr. 27 ; Starter motor, alternator, battery .



Note

- ◆ Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.
- ◆ When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.



2 Ventilation adjustment mechanism (heating and air conditioning).



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ➔ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery.



Note

- ◆ Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.
- ◆ When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.

2.1 Ventilation / air conditioning adjustment mechanism power connectors

For vehicles equipped with an air conditioning system.

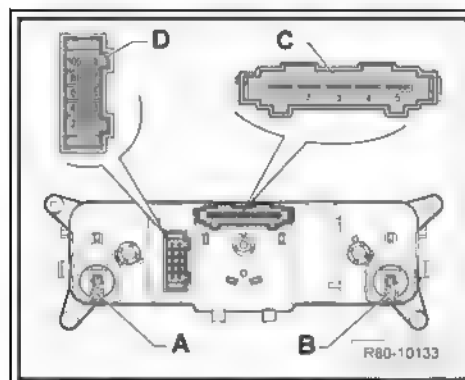
- ◆ Vehicles with Ventilation system ➔ [page 15](#).
- ◆ Vehicles with Heating system ➔ [page 16](#).



Remove and install ventilation control unit → [page 14](#) .

Position of connectors in the rear section of the adjustment mechanism for heating and air conditioning:

- A- Air distribution command cable
- B- Temperature adjustment command cable.
- C- Housing for 5-pole supply connector.
- 1- 4th Ventilation speed.
- 2- 3rd Ventilation speed.
- 3- 2nd Ventilation speed.
- 4- 1st Ventilation speed.
- 5- Terminal -X- contact.
- D- Housing for 10-pole supply connector.
- 3- Wrench (+).
- 4- Fresh air.
- 5- Terminal 31.
- 6- Battery (+).
- 7- A/C.
- 8- Switch (+).
- 9- Terminal 58s.
- 10- Recirculation.



Note

Connector pins in the ventilation / heating adjustment mechanisms can also be found in the electrical diagrams → Current flow diagrams, Electrical fault finding and Fitting locations.



3 Command cables - remove and install

Removing and installing the command cable: ➔ [page 17](#) .





4 Service valves - location


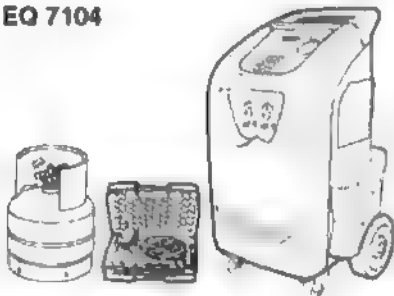
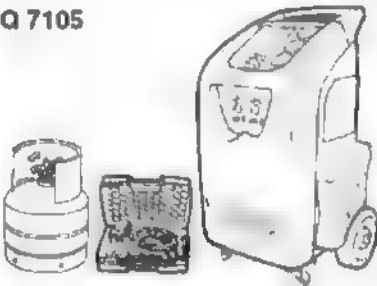


Note

- ◆ The service valves are located in the engine compartment, at the right side of the vehicle, near the front end.
- ◆ Other available equipment and tools for tests may also be used; refer to ➔ Air conditioning with R134a refrigerant, Rep. gr. 00 ; Technical data

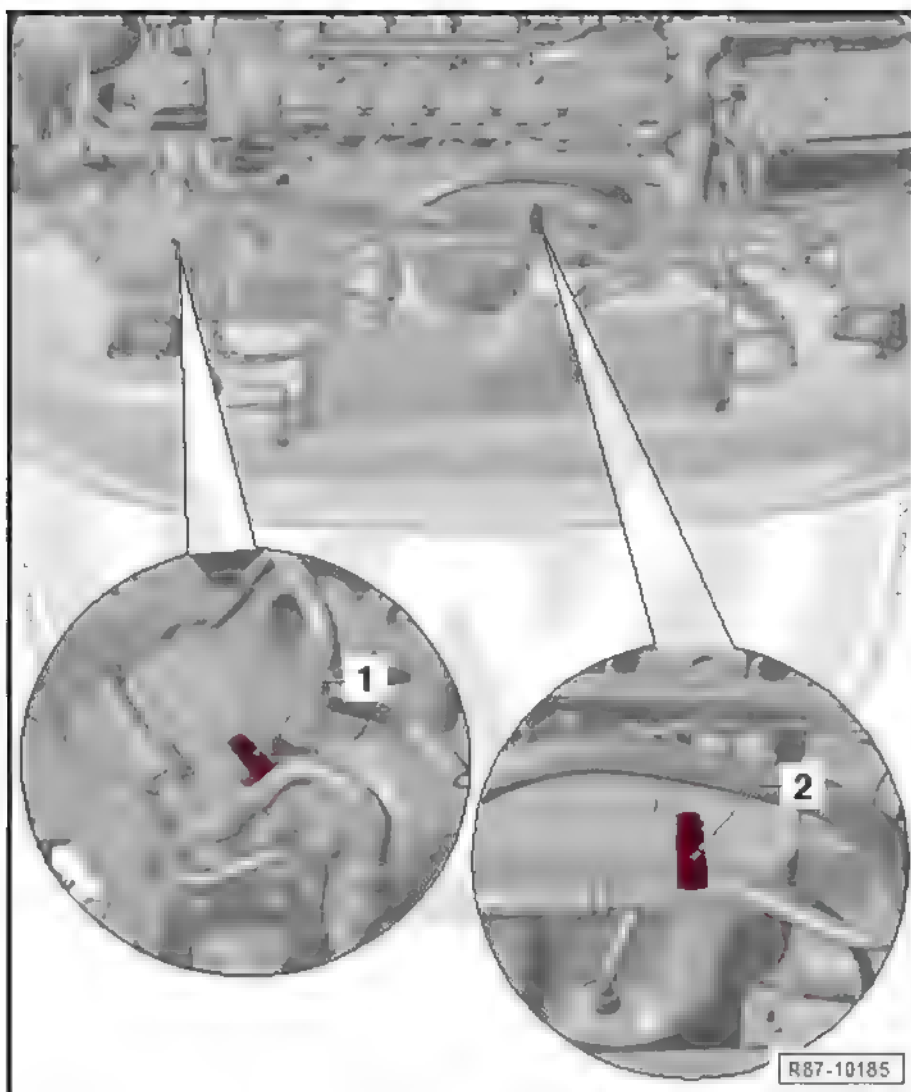
Special tools and workshop equipment required

- ◆ Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7104-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7105-

EQ 7098 	EQ 7104 
EQ 7105 	

Q87-10002

- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ➔ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .





5 Air conditioning with manual adjustment

5.1 Heating and air conditioning - passenger compartment components



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ➔ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery.



Note

- ◆ *Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.*
- ◆ *When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.*



1 - Demisting baffle

- ☐ Removal only with the instrument panel removed ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation

2 - Side air baffles

- ☐ Remove and install ⇒ [page 6](#)

3 - Defogger nozzle

- ☐ Remove and install ⇒ [page 9](#)

4 - Right air duct

- ☐ For the right air baffle on the panel ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation

5 - Left air duct

- ☐ For the left air baffle on the panel ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation

6 - Air distributor for baffles

- ☐ Remove and install ⇒ [page 9](#)

7 - Front left air duct in the footwell

- ☐ Remove and install ⇒ [page 8](#)

8 - Middle air duct

- ☐ Remove and install ⇒ [page 9](#)

9 - Front right air duct for the footwell

- ☐ Remove and install ⇒ [page 9](#)

10 - Central air baffles

- ☐ Remove and install ⇒ [page 6](#)

11 - Ventilation adjustment mechanism

- ☐ Remove and install ⇒ [page 14](#)

12 - Sealing

- ☐ Note installation position ⇒ [page 50](#)
- ☐ Replace if damaged

13 - Heat exchanger

- ☐ Remove and install ⇒ [page 33](#)

14 - Fresh air blower pre-resistor with overheating cut-out - N24-

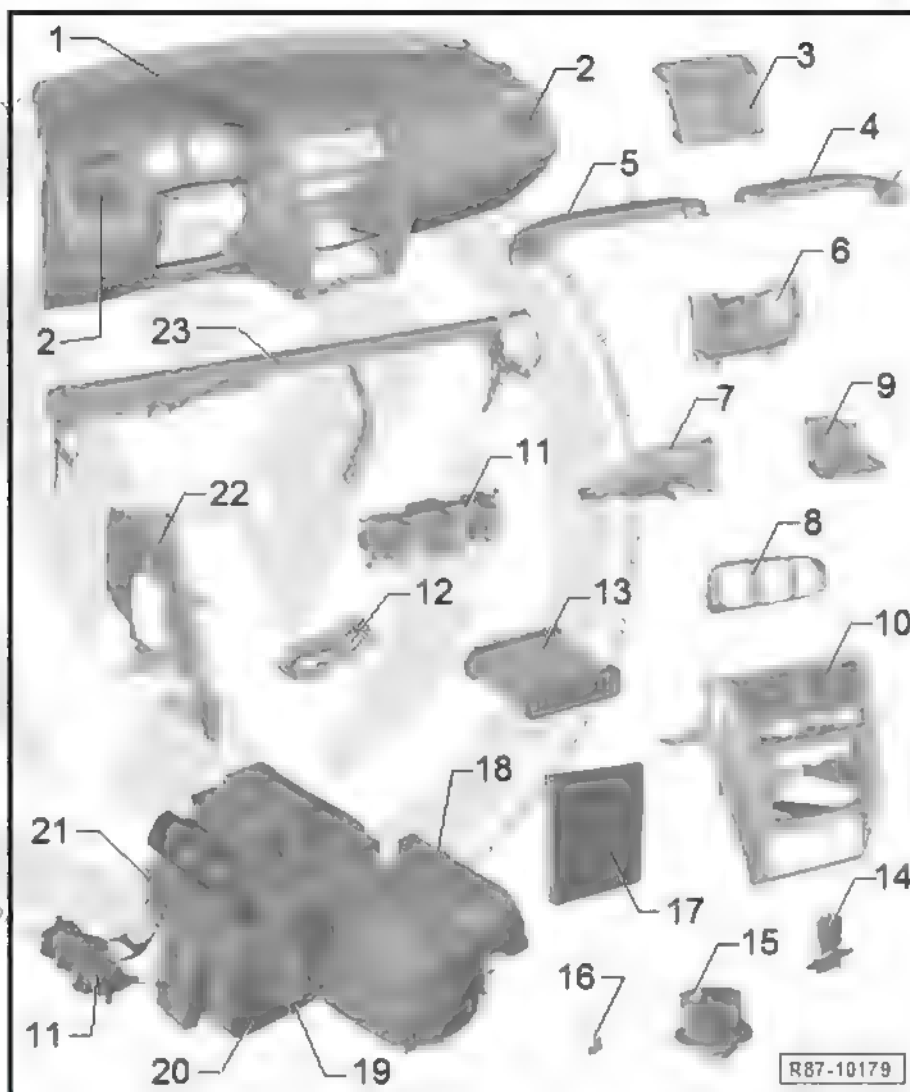
- ☐ Remove and install ⇒ [page 4](#)

15 - Fresh air blower - V2-

- ☐ Remove and install ⇒ [page 3](#)

16 - Control motor for natural air valve and recirculation valve - V154-

- ☐ Remove and install ⇒ [page 32](#)





17 - Dust and pollen filter

- ☐ Remove and install ➔ [page 5](#)

18 - Air intake duct housing

19 - Dust and pollen filter compartment

20 - Heat exchanger compartment

21 - Plenum chamber

- ☐ Remove and install ➔ [page 52](#)

22 - Cross member left mounting

- ☐ Remove and install ➔ General body repairs, interior; Rep. gr. 70 ; Lining / insulation

23 - Cross member

- ☐ Remove and install ➔ General body repairs, interior; Rep. gr. 70 ; Lining / insulation

5.2 Seals of the engine compartment partition panel

For vehicles equipped with an air conditioning system.

- ◆ Vehicles with Ventilation / Heating system ➔ [page 3](#) .

1 - Expansion valve

- ☐ Remove and install
➔ [page 101](#)

2 - Plenum chamber (air conditioning)

- ☐ Remove and install
➔ [page 52](#)

3 - Evaporator drainage duct

- ☐ The water output valve must not be blocked or obstructed
- ☐ Check the correct installation position of the seal for the water output valve in the partition panel

4 - Heat exchanger intake duct

- ☐ Heat exchanger - remove and install
➔ [page 33](#)

5 - Heat exchanger outlet duct

- ☐ Heat exchanger - remove and install
➔ [page 33](#)

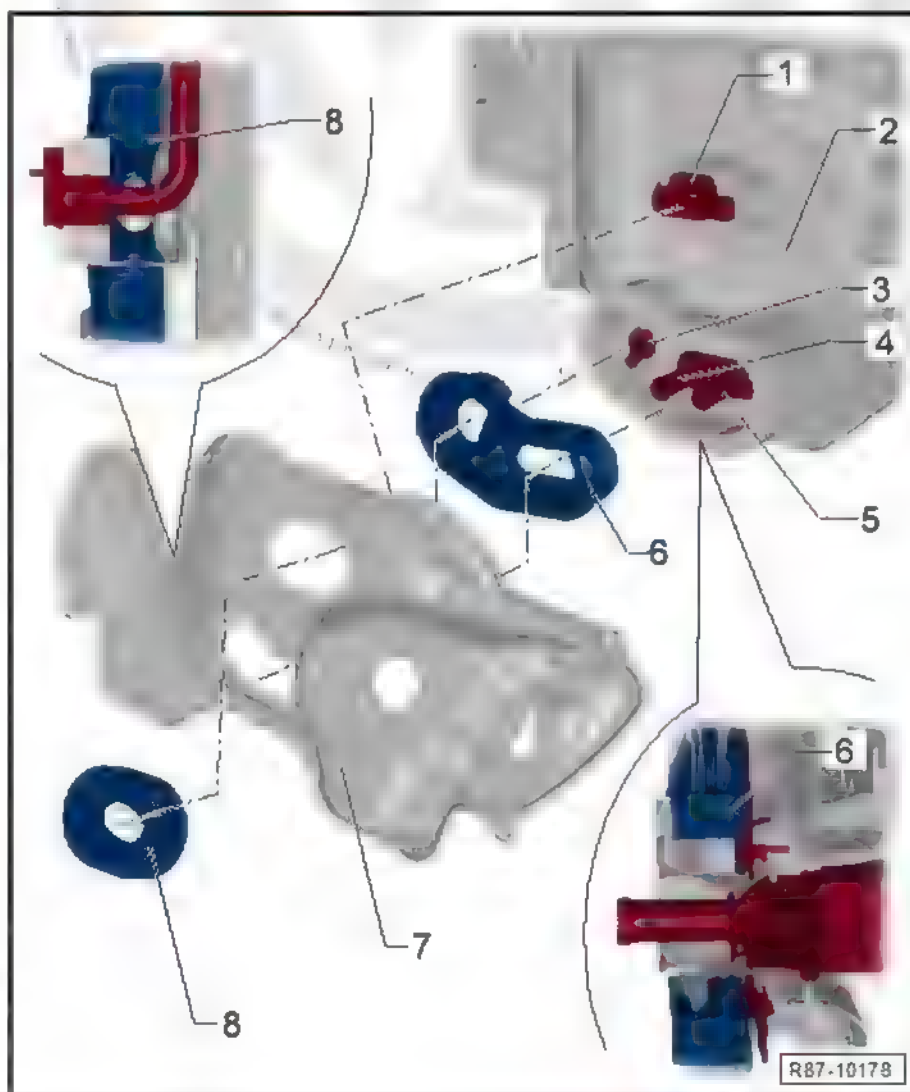
6 - Heat exchanger sealing

- ☐ Replace if damaged

7 - Engine compartment's partition panel

8 - Sealing of expansion valve

- ☐ Replace if damaged





5.2.1 Evaporator water drain valve overflow pipe - remove and install

Removal:

- Remove the air filter ⇒ Engine; Rep. gr. 24 ; Supply system - fuel injection
- Remove the bulkhead noise insulation
- Remove the evaporator water drain valve overflow pipe

Installation:

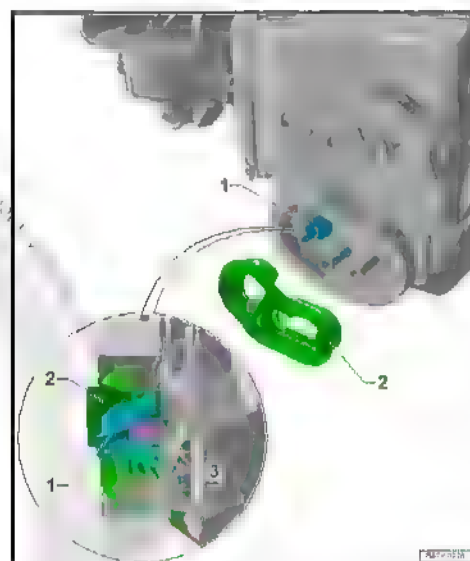
Installation is performed in reverse sequence to the removal, observing the following:

- Check the proper pipe installation position -1- in the seal -2- and water drain valve of the evaporator -3-
- Check the proper installation position of the evaporator water drain valve in the bulkhead. ⇒ [page 50](#)



Note

The water drain valve must not be blocked or obstructed. Water intake through the valve may cause customer complaints due to foul odours in the heating / air conditioning system and/or humidity inside the vehicle.





6 Plenum chamber (air conditioning) - remove and install



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ➔ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery.



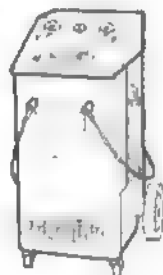
Note

- ◆ Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.
- ◆ When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.

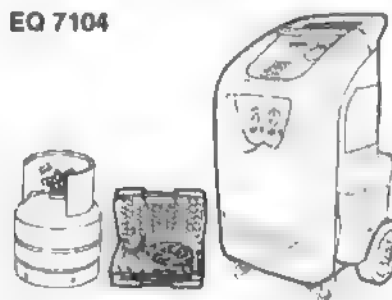
Special tools and workshop equipment required

- ◆ Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7104-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7105-
- ◆ Clamps (diameter 25 mm) - 3094-
- ◆ Oil collecting tray - VAG 1306-
- ◆ Standard-type clamp pliers - VW 5162 (VWB) - ou - VAS 5024A-

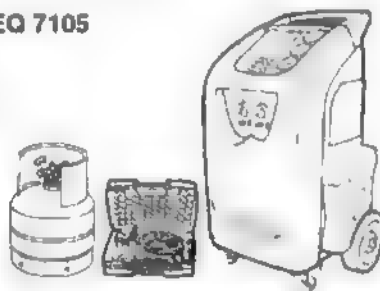
EQ 7098



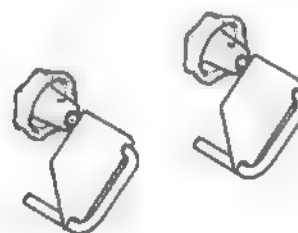
EQ 7104



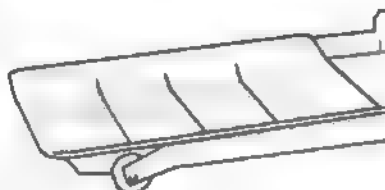
EQ 7105



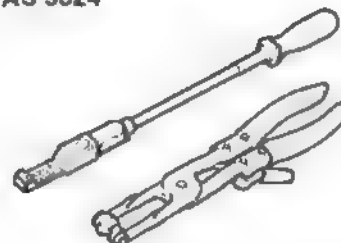
3094



VAG 1306



VAS 5024

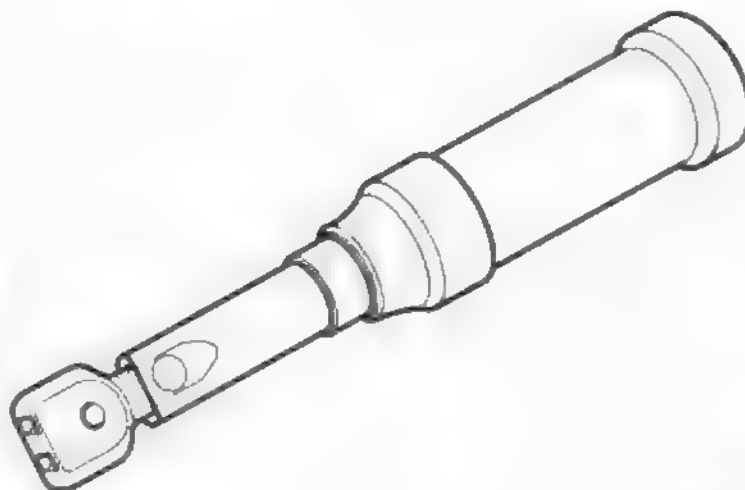


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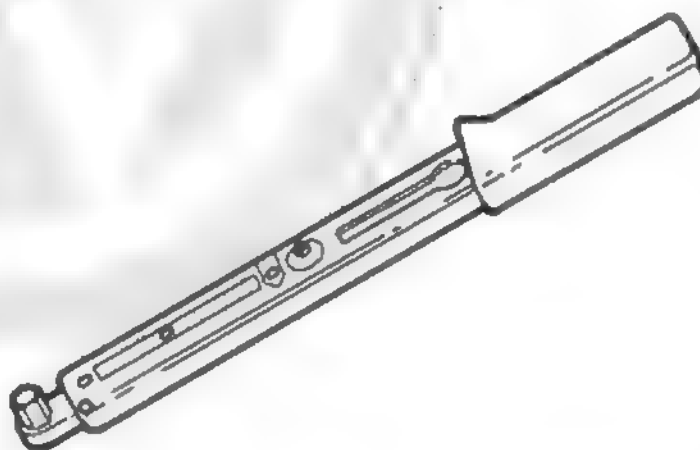
- ◆ Torque wrench 2 to 10 Nm
- VAG 1783-

V.A.G 1783



Q00-10085

V.A.G 1331



Q00-10065

Torque wrench - 5 to 50 Nm (enc 1/2") - VAG 1331-



6.1 Plenum chamber - remove and install

Assembly overview:

1 - Cross member

- ☐ Remove and install ➔
Body - Internal assembly works; Rep. gr. 70 ;
Lining / insulation .

2 - Heat exchanger sealing

- ☐ Note installation position ➔ [page 50](#)
- ☐ Replace if damaged

3 - Sealing of expansion valve

- ☐ Note installation position ➔ [page 50](#)
- ☐ Replace if damaged

4 - Screws

- ☐ 2 units
- ☐ 12 ± 1.2 Nm

5 - Dust and pollen filter compartment

- ☐ Dust and pollen filter -
remove and install
➔ [page 5](#)

6 - Heat exchanger compartment

- ☐ Heat exchanger -
remove and install
➔ [page 33](#)

7 - Air distribution command cable

- ☐ Remove and install
➔ [page 17](#)

8 - Cross member left mounting

- ☐ Remove and install ➔ General body repairs, interior; Rep. gr. 70 ; Lining / insulation

9 - Screws

- ☐ 4 units
- ☐ 12 ± 1.2 Nm

10 - Screws

- ☐ 2 units
- ☐ 12 Nm

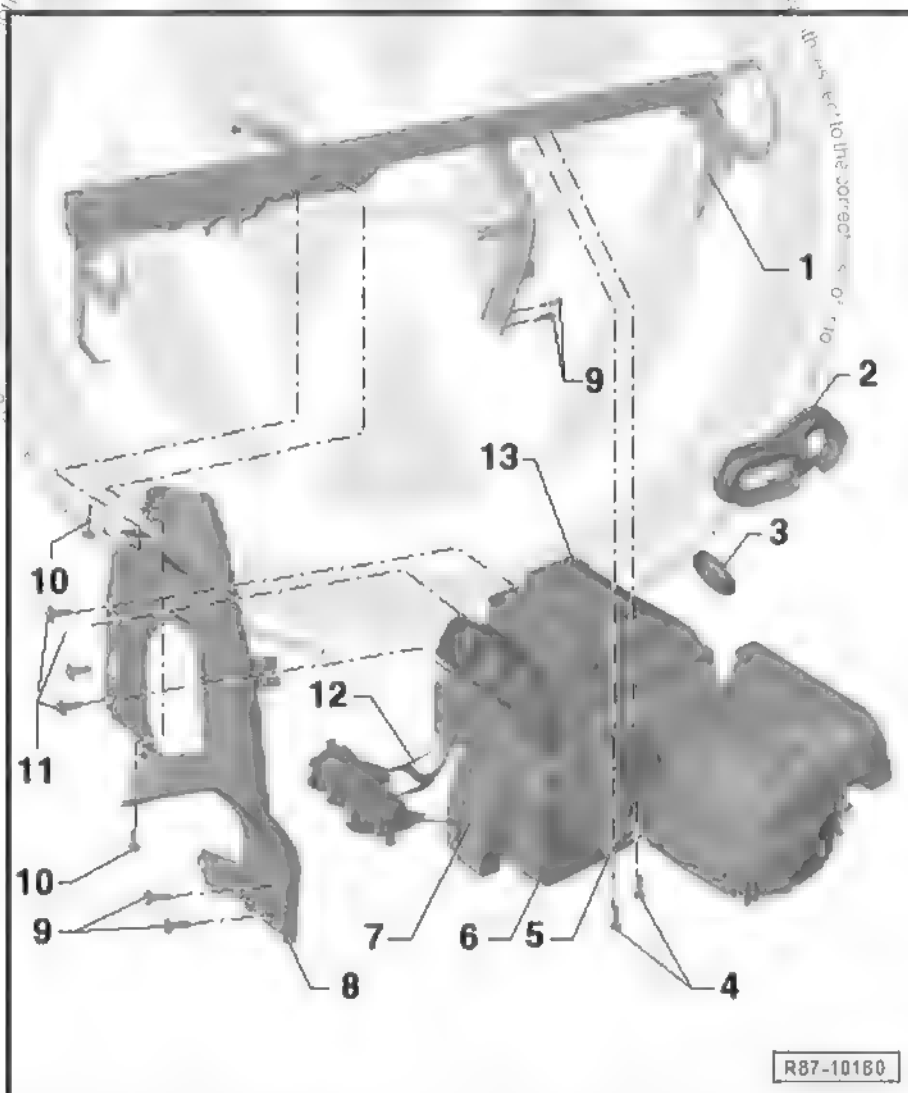
11 - Screws

- ☐ 3 units
- ☐ 5 ± 0.5 Nm

12 - Temperature command cable

- ☐ Remove and install ➔ [page 17](#)

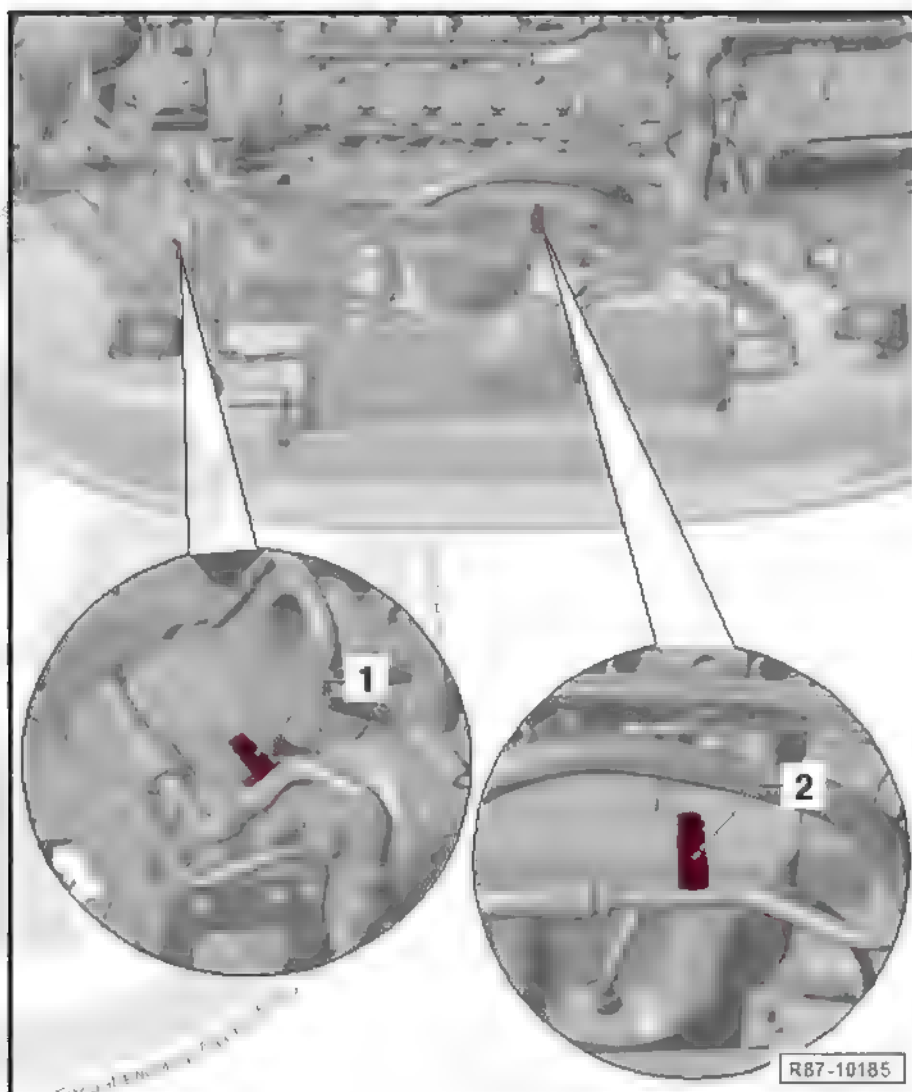
13 - Evaporator compartment





6.1.1 Removal

- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ➔ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .



- Loosen the securing bolts -arrows- and remove refrigerant circuit tubing.

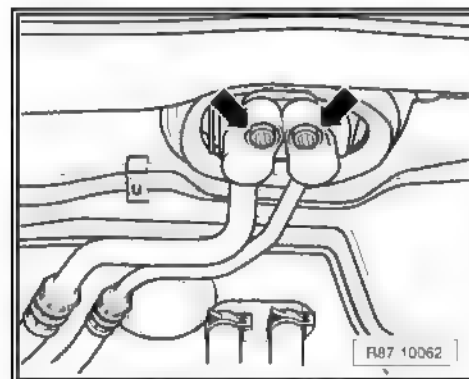


WARNING

Risk of burns!

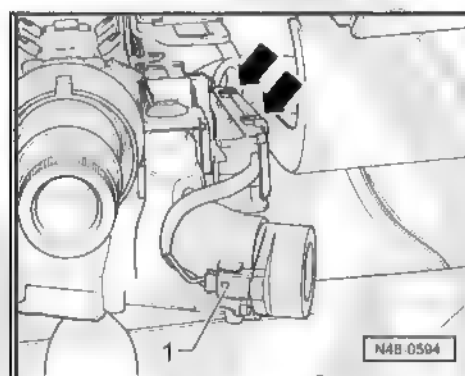
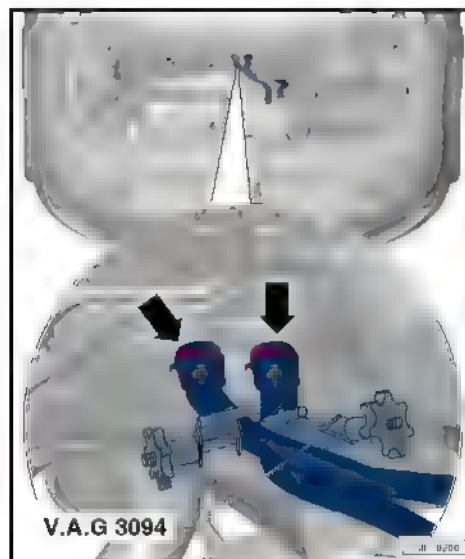
*With hot engine, the coolant temperature may be over 100°C.
The cooling system is pressurized.*

Before starting any work, reduce pressure and temperature, if required.



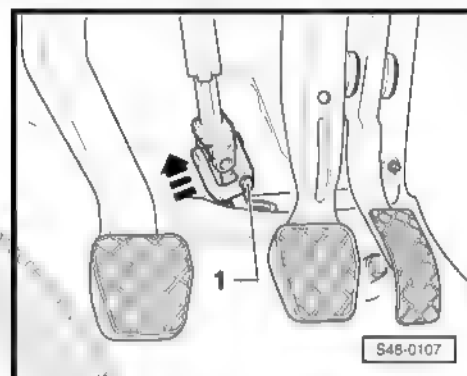
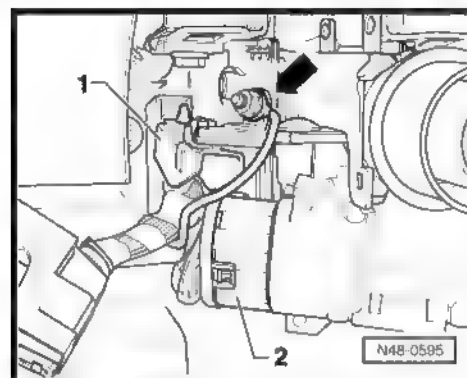


- Close the coolant hoses in engine compartment by using the Clamps (diam. 25 mm) - 3094-
- Release the clamps -arrows- with the Standart-type clamp pliers - VW 5162 (VWB) - ou - VAS 5024A- and remove the hoses.
- Install a hose on one of the heat exchanger outlets. At the other outlet, place a container to collect coolant.
- Use a compressed air pistol to remove the coolant from the heat exchanger.
- Turn off the ignition and all electrical equipment, and remove the key from ignition.
- Disconnect the Battery - A- ➔ Electrical devices; Rep. gr. 27 ; Starter motor, alternator, battery .
- Remove the Combined instrument - K- ➔ Electrical system; Rep. gr. 90 ; Instrument case, indicators .
- Remove the Radio - R- or "CD player" - R89- from the instrument panel ➔ Communication; Rep. gr. 91 ; Radio equipment .
- Remove the switches from the instrument panel ➔ Electrical equipment; Rep. gr. 96 ; Switches, lights and internal lights, alarm .
- Remove the centre frame of the dash panel ➔ General body repairs, interior; Rep. gr. 70 ; Linings/insulations .
- Remove ventilation adjustment mechanism ➔ [page 14](#) .
- Remove the steering wheel ➔ Chassis, axles, steering; Rep. gr. 48 ; Steering .
- Remove the steering column covering ➔ General body repairs, interior; Rep. gr. 70 ; Lining / Insulation .
- Remove the turn signal and wiper/washer switches ➔ Electrical system; Rep. gr. 94 ; Switches, lights, and external lamps .
- Disconnect the connector -1- from the Immobilizer reading coil - D2- .
- Open the support (right side) of the cables on the tabs -arrows- and remove the cable.
- Disconnect the earth strap from the steering column -arrow-.





- Remove the earth strap and the support (left side) from the cables -1- in the switchbox.
- Disconnect the Ignition switch - D- -2- into the steering lock set.
- Remove the dash panel ⇒ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Remove demister nozzle and air distributor to the central baffles ⇒ [page 9](#) .
- Remove footwell air duct (front left) ⇒ [page 8](#) .
- Remove footwell air duct (front right) ⇒ [page 9](#) .
- Remove the fastening screw -1- from the universal joint and unhook the universal joint in the direction -arrow- ⇒ Chassis, axels, steering ; Rep. gr. 48 ; Steering .
- Release fastening screws at left -A- and right -B- sides.





- Remove the cross member ⇒ Body - Internal assembly works; Rep. gr. 70 ; Lining/insulation .
- Remove the supports (right and left) from the dash support ⇒ Body - Internal assembly work; Rep. gr. 70 ; Lining / insulation .
- Carefully separate the plenum chamber from the panel and disconnect the connectors from the plenum chamber.
- Remove the plenum chamber.

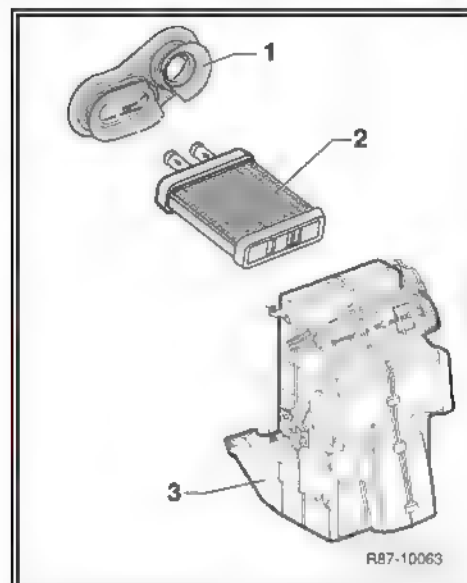
6.1.2 Installation

Installation is performed in reverse sequence to the removal, observing the following.

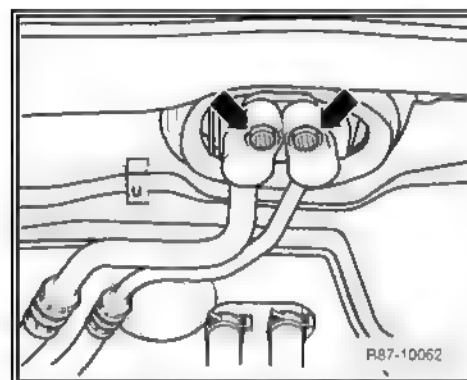
- Mount harnesses and all the connectors in their original positions.

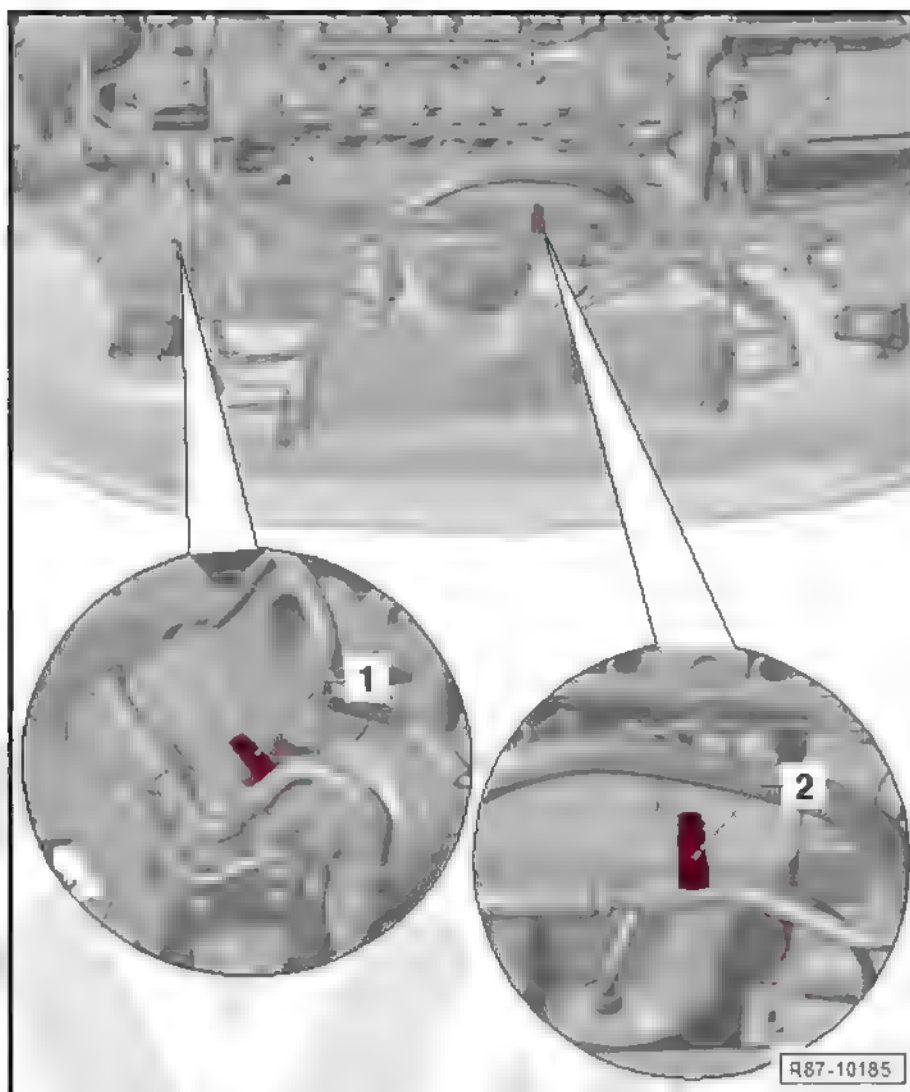


- Observe the installation position of the seal -1- and of the hoses on the heat exchanger -2- ➔ [page 50](#) .



- Tighten the securing bolts -arrows- for the refrigerant circuit to (10 Nm).
- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ➔ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .





- Check the amount of gas supplied ➔ [page 117](#) .



Note

After removal or replacement of heat exchanger, the cooling system will have air; to remove the air, proceed as follows:

- Start the engine and keep it at 2500 rpm speed until coolant level in tank lowers due to opening of thermostat valve (the air that was in the heat exchanger is moved to the coolant tank, causing coolant level there to decrease).
- Replenish the coolant tank level. Engine, Rep gr. 19 ; Cooling system .



6.2 Evaporator housing - general overview of assembly

1 - Sealing

- ☐ Replace if damaged

2 - Air distributor box in upper part

- ☐ Do not remove
- ☐ With temperature and air distributor hatch

3 - Control motor for natural air valve and recirculation valve - V154-

- ☐ Remove and install
⇒ [page 32](#)

4 - Air distributor box in lower section

5 - Clip

- ☐ Replace if damaged

6 - Fresh air fan - V2-

- ☐ Remove and install
⇒ [page 3](#)

7 - Clip

- ☐ Replace if damaged

8 - Natural air fan pre-resistor with overheating fuse - N24-

- ☐ Remove and install
⇒ [page 4](#)

9 - Heater unit harnesses

10 - Dust and pollen filter

- ☐ Remove and install
⇒ [page 5](#)

11 - Air distribution command cable

- ☐ Remove and install ⇒ [page 17](#)

12 - Temperature command cable

- ☐ Remove and install ⇒ [page 17](#)

13 - Air distributor chamber

14 - Screw

- ☐ 1.5 Nm

15 - Evaporator

- ☐ Remove and install the plenum chamber ⇒ [page 52](#)

16 - Heat exchanger

- ☐ Remove and install ⇒ [page 33](#)

17 - Sealing rings

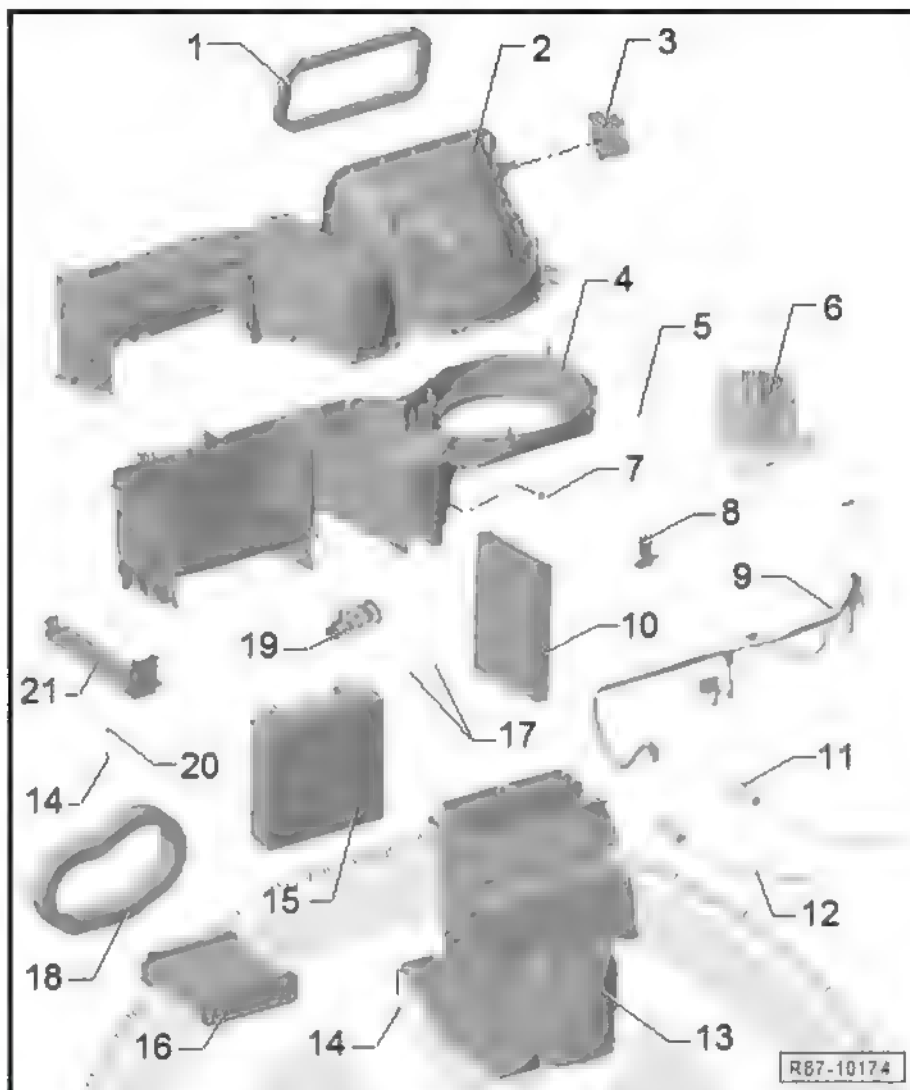
- ☐ Replace

18 - Heat exchanger sealing

- ☐ Replace if damaged

19 - Expansion valve

- ☐ Remove and Install ⇒ [page 101](#)





20 - Bushing

21 - Dust and pollen filter cover

6.3 Cooling gas loop (engine compartment)



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ➔ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery.



Note

- ◆ *Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.*
- ◆ *When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.*
- ◆ *Only the components tagged with asterisk (*) can be replaced without being opened or without sucking out the cooling loop gas.*



- ☐ Low pressure side

6.4 Ambient temperature sensor - G17-



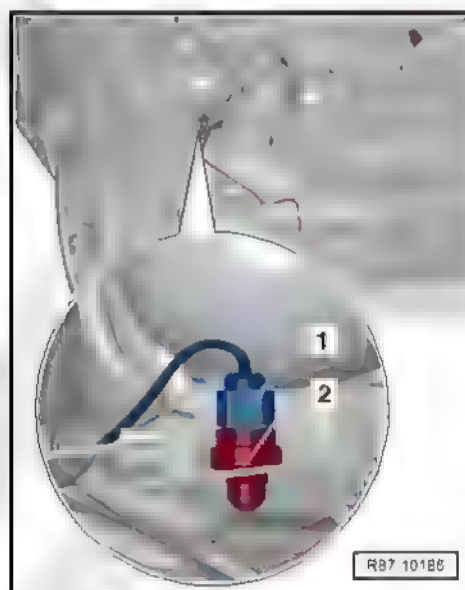
Note

For removal/installation and/or testing, consult ⇒ *Communication; Rep. gr. 91; Radio, telephone, navigation system.*

6.5 High pressure sensor - G65- - remove and install

6.5.1 Removal

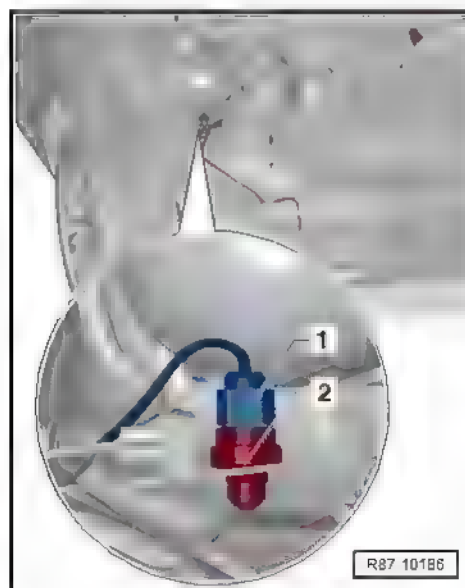
- Remove power connector -1-.
- Unscrew and remove the High pressure sensor - G65- -2-.



6.5.2 Installation

Installation is performed in reverse sequence to the removal, observing the following:

- Replace sealing ring.
- Tighten the High pressure sensor - G65- -2- to a (8 Nm) torque.



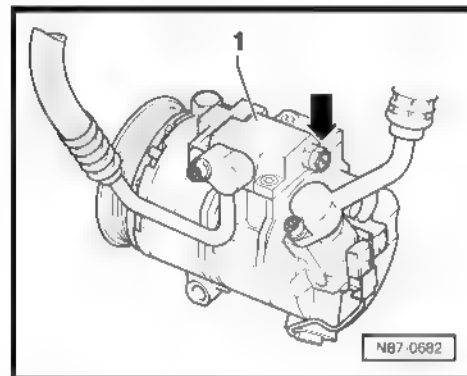


6.6 High pressure sensor - G65- - check

- Connect the Diagnosis, Measurement and Information System - VAS 5052- or later equipment
- Proceed by selecting the desired functions ⇒ Vehicle diagnostic tester.

6.7 Pressure relief valve in the compressor - check

Check the pressure relief valve on compressor:



Compressor			Valve opening pressure	Valve closing pressure
2MZ	Delphi	5U0 820 803	38 ± 3 bar	
2MZ	Delphi	5U0 820 803 A	38 ± 3 bar	
DV9	Doowon	1S0 820 803 C	35.5 - 42.4 bar	28.6 bar

- ◆ The activation (opening) of the overpressure valve can be checked by the presence of refrigerant lubricant in the area adjacent to the valve -arrow-.



7 Air conditioner compressor support



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ➔ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery .



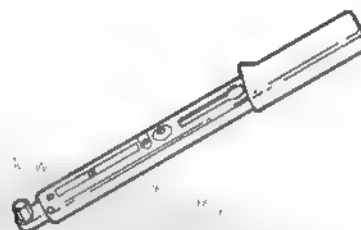
Note

- ◆ *Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap*
- ◆ *When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.*

Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm (enc. 1/2") - VAG 1331-

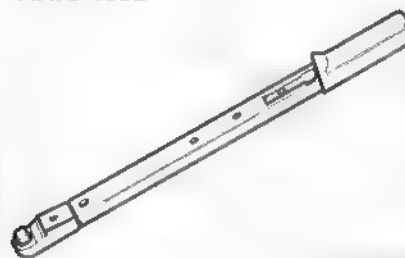
V.A.G 1331



Q00-10085

- ◆ Torque wrench 40 - 200 Nm - VAG 1332

V.A.G 1332



Q00 10074



7.1 Air conditioning compressor support for EA111 1.0-litre and 1.6-litre engines - remove and install



Note

- ◆ The compressor support and respective components can be removed and installed without the need for opening the refrigerant circuit
- ◆ Remove and install the Poly-V (elastic) belt: ➔ Engine; Rep. gr. 13; Crankshaft, pistons.

1 - Compressor support

Removal:

- Remove the power steering pump and set it aside ➔ Chassis, Axles, Steering; Rep. gr. 48; Steering.
- Remove the Generator (alternator) - C- ➔ Electrical system; Rep. gr. 27; Starter, alternator battery.
- Remove compressor from support and fasten it to body ➔ Item 5 (page 68).
- Remove the bolts -2- and remove the cylinder block support -1-.

Installation:

Installation is performed in reverse sequence to the removal, observing the following:

- Replace the fastening screws.
- Install the securing bolts -2-, tightening them in cross pattern with a torque of (50 Nm).

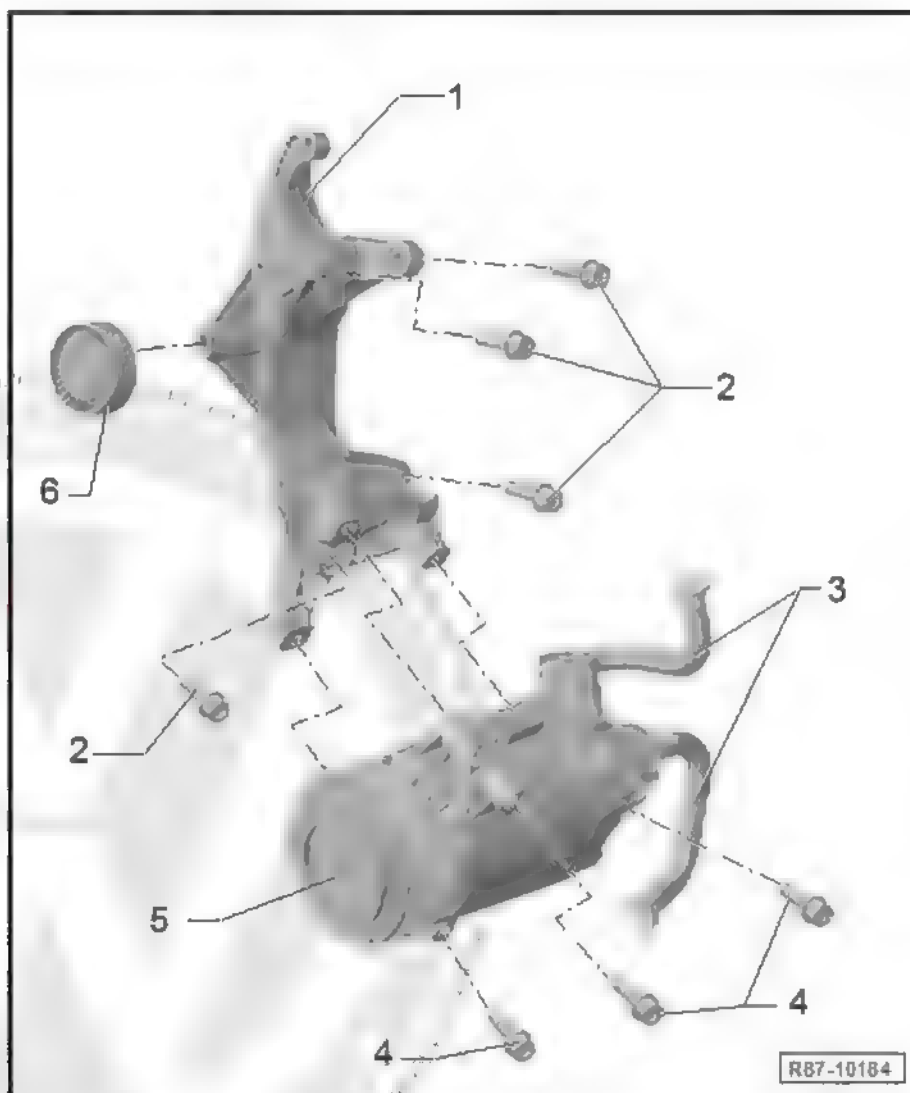
2 - Screws

- ☐ 4 units
- ☐ 50 Nm

3 - Cooling system hoses

4 - Screws

- ☐ 3 units
- ☐ 23 Nm





5 - Compressor

Removal:

- Remove Poly-V belt ➔ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- Remove fastening screws -4-.
- Remove compressor from support and fasten it to body ➔ [page 68](#).

Installation:

Installation is performed in reverse sequence to the removal, observing the following:

- Tighten the compressor securing bolts -4- to (23 Nm).
- Check Poly-V belt travel ➔ [page 68](#) .



Note

In the event the compressor needs to be completely removed, see ➔ [page 81](#)

6 - Reversing pulley.

- 45 ± 4.5 Nm

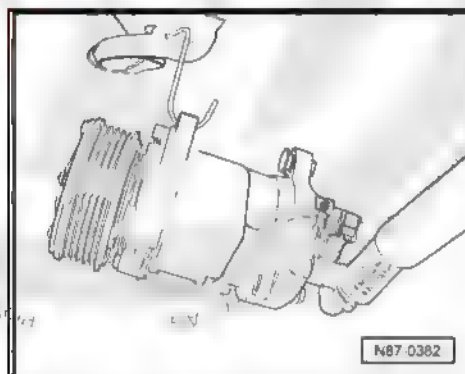
Fastening the air conditioner compressor to the body:

If the air conditioning compressor is removed and the cooling gas loop is not opened, the compressor must be fastened to the body with a suitable auxiliary mean, such as a wire. If it is necessary to fully remove the compressor, refer to ➔ [page 81](#).



Note

Make sure that the flexible refrigerant hoses on the compressor remain unstressed.

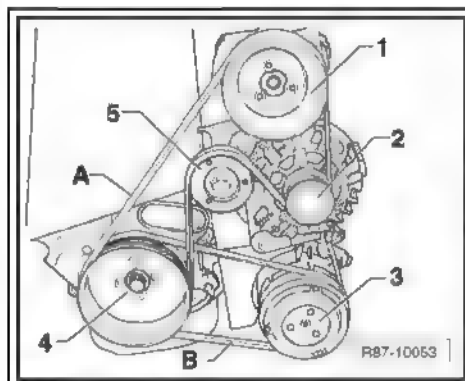


Poly-V (elastic) belt travel:

A - Poly-V belt (elastic) for the power steering and Generator (Alternator) - C- oil pump.

B - Poly-V belt (elastic) for air conditioner compressor.

- 1 - Power steering oil pump pulley.
- 2 - Generator (Alternator) - C- pulley.
- 3 - Air conditioning compressor pulley.
- 4 - Crankshaft pulley.
- 5 - Reversing pulley.



Note

When installing the belt, ensure that the pulley is correctly positioned.



8 Coolant gas loop



WARNING

Before working on the heating and air conditioning system, it is necessary to disconnect the battery earth strap from the Battery - A- ➔ Electrical equipment; Rep. gr. 27; Starter motor, alternator, battery .




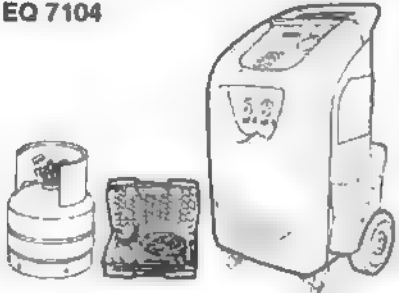
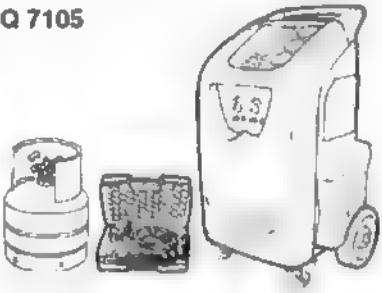

Note

- ◆ *Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.*
- ◆ *When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.*
- ◆ *Repairs to the refrigerant circuit must only be performed at authorized and specialized technical assistance workshops.*
- ◆ *The refrigerant must be aspirated with the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098, or similar equipment ➔ Air conditioning with R134a refrigerant; Rep. gr. 00; Technical data .*
- ◆ *Indications on repair work on vehicles with air conditioning system and how to handle the refrigerant ➔ page 42 .*
- ◆ *All refrigerant circuit components that are open must be closed with proper plugs to prevent humidity from entering them.*
- ◆ *The color identification of refrigerant circuit sealing rings with R134a is no longer used. Black sealing rings are now used.*



Special tools and workshop equipment required

- ◆ Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7104-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7105-
- ◆ Torque wrench - 5 to 50 Nm (enc. 1/2") - VAG 1331-

EQ 7098 	EQ 7104 
EQ 7105 	VAG 1331 
	Q87-10003



Note

For indications of additional tools and indications on how to carry out repairs in vehicles with air conditioning and how to handle refrigerant can be found in the ELSA system ⇒ Air conditioning with R134a refrigerant; Rep. gr. 00 ; Technical data .

8.1 Refrigerant circuit - assembly overview



Note

Only the components tagged with asterisk () could be replaced without being opened or without aspirating the cooling circuit gas.*

(Delphi Condenser):



1 - High pressure sensor - G65- (*)

- ☐ Remove and install
→ [page 64](#)
- ☐ Check → [page 65](#)

2 - Nuts

- ☐ 1.9 ± 0.1 Nm

3 - Screws

- ☐ 10 ± 1 Nm

4 - Sealing ring

- ☐ Replace

5 - Sealing ring

- ☐ Replace

6 - Expansion valve

- ☐ Remove and install
⇒ [page 101](#)

7 - Sealing ring

- ☐ Replace

8 - Sealing ring

- ☐ Replace

9 - Hose

- ☐ High pressure
- ☐ From the drying filter container to the evaporator

10 - Nut

- ☐ 1.9 ± 0.1 Nm

11 - Evaporator

12 - Plate

13 - Service valve

- ☐ High pressure
- ☐ Location ⇒ [page 46](#)
- ☐ Environmental contamination by the cooling gas is a punishable offense
- ☐ Filling capacities ⇒ [page 117](#)

14 - Screw

- ☐ 22 Nm

15 - Sealing ring

- ☐ Replace

16 - Screw

- ☐ 12 ± 1 Nm

17 - Screw

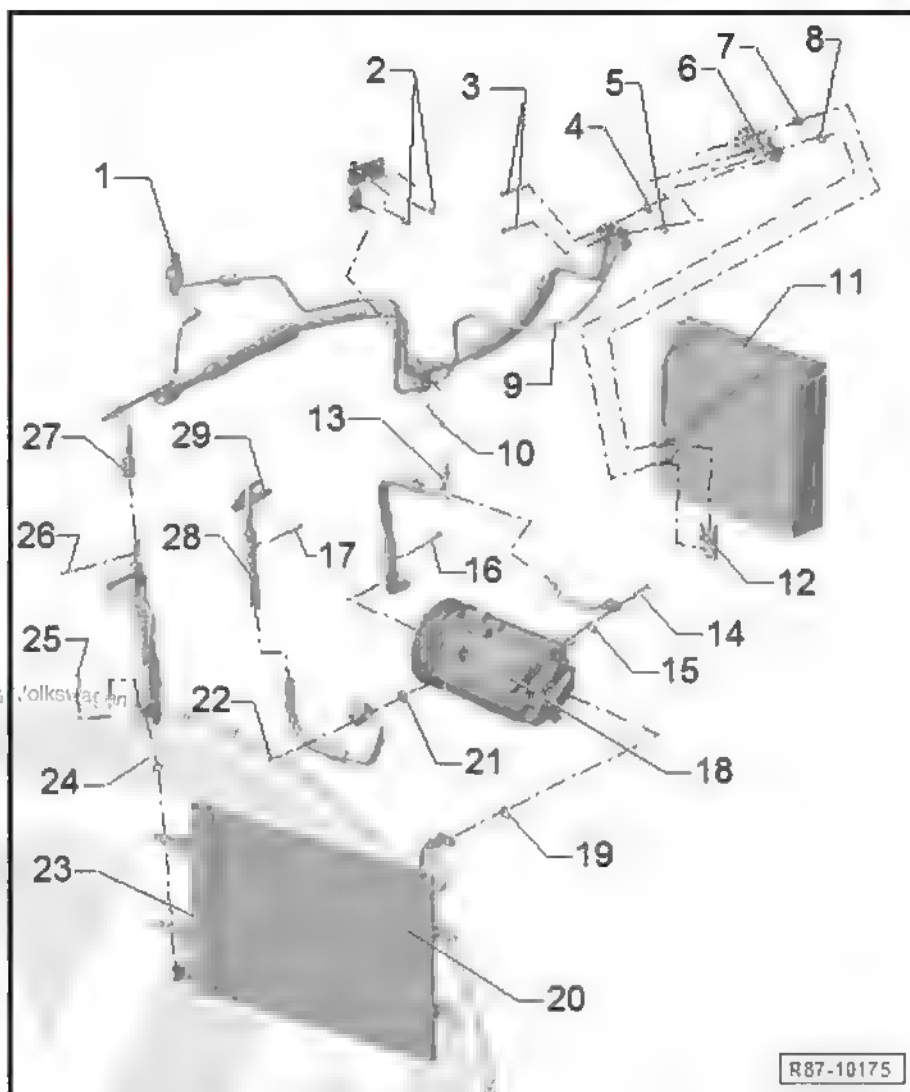
- ☐ 5 Nm

18 - Compressor

- ☐ Remove and install → [page 81](#)

19 - Sealing ring

- ☐ Replace





20 - Condenser

- ☐ Remove and install ➔ [page 85](#)

21 - Sealing ring

- ☐ Replace

22 - Screw

- ☐ 22 ± 1 Nm

23 - Dryer filter receiver

- ☐ Remove the filtering element ➔ [page 95](#)

24 - Sealing ring

- ☐ Replace

25 - Screw

- ☐ 12 ± 1 Nm

26 - Screw

- ☐ 5 ± 0.5 Nm

27 - Quick coupling

- ☐ Remove and install ➔ [page 104](#)

28 - Hose

- ☐ Low pressure
- ☐ From the evaporator to the compressor

29 - Service valve

- ☐ Low pressure
- ☐ Location ➔ [page 46](#)
- ☐ Environmental contamination by the cooling gas is a punishable offense
- ☐ Filling capacities ➔ [page 117](#)

(Denso Condenser):



1 - High pressure sensor - G65- (*)

- ☐ Remove and install ➔ [page 64](#)
- ☐ Check ➔ [page 65](#)

2 - Nuts

- ☐ 1.9 Nm

3 - Screws

- ☐ 10 ± 1 Nm

4 - Expansion valve

- ☐ Remove and install ➔ [page 101](#)

5 - Sealing ring

- ☐ Replace
- ☐ 11.10 mm; 1.78 mm

6 - Sealing ring

- ☐ Replace
- ☐ 17.17 mm; 1.78 mm

7 - Sealing ring

- ☐ Replace
- ☐ 10.8 mm; 1.82 mm

8 - Sealing ring

- ☐ Replace
- ☐ 14.30 mm; 2.40 mm

9 - Hose

- ☐ High pressure
- ☐ From the drying filter container to the evaporator

10 - Nut

- ☐ 1.9 ± 0.1 Nm

11 - Evaporator

12 - Plate

13 - Service valve

- ☐ High pressure
- ☐ Location ➔ [page 46](#)
- ☐ Environmental contamination by the cooling gas is a punishable offense
- ☐ Filling capacities ➔ [page 117](#)

14 - Screw

- ☐ 5 ± 0.5 Nm

15 - Screw

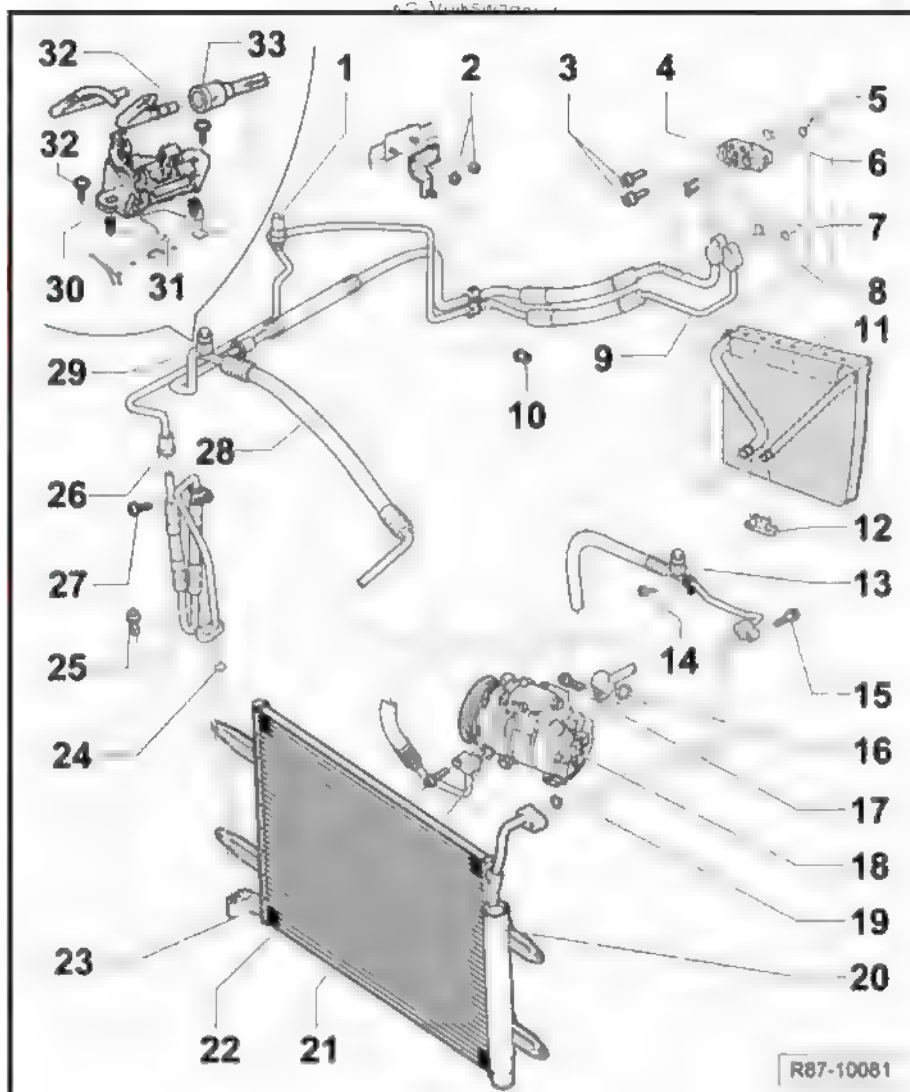
- ☐ 12 ± 1 Nm

16 - Sealing ring

- ☐ Replace
- ☐ 14.3 mm; 2.4 mm

17 - Screw

- ☐ 22 ± 1 Nm





18 - Compressor

- ☐ Remove and install ➔ [page 81](#)

19 - Sealing ring

- ☐ Replace
- ☐ 10.8 mm; 1.82 mm

20 - Dryer filter receiver

- ☐ Remove the filtering element ➔ [page 95](#)

21 - Sealing ring

- ☐ Replace
- ☐ 10.8 mm; 1.82 mm

22 - Screw

- ☐ 22 ± 1 Nm

23 - Condenser

- ☐ Remove and install ➔ [page 85](#)

24 - Sealing ring

- ☐ Replace
- ☐ 10.8 mm; 1.82 mm

25 - Screw

- ☐ 12 ± 1 Nm

26 - Quick coupling

- ☐ Remove and install ➔ [page 104](#)

27 - Screw

- ☐ 5 ± 0.5 Nm

28 - Hose

- ☐ Low pressure
- ☐ From the evaporator to the compressor

29 - Service valve

- ☐ Low pressure
- ☐ Location ➔ [page 46](#)
- ☐ Environmental contamination by the cooling gas is a punishable offense
- ☐ Filling capacities ➔ [page 117](#)

30 - Pipe support

31 - Bushings

32 - Screws

- ☐ 1.8 ± 0.2 Nm.

33 - Quick coupling

- ☐ Remove and install ➔ [page 104](#)



8.2 Air conditioning magnetic clutch - N25- manufacturer (Delphi) - repair

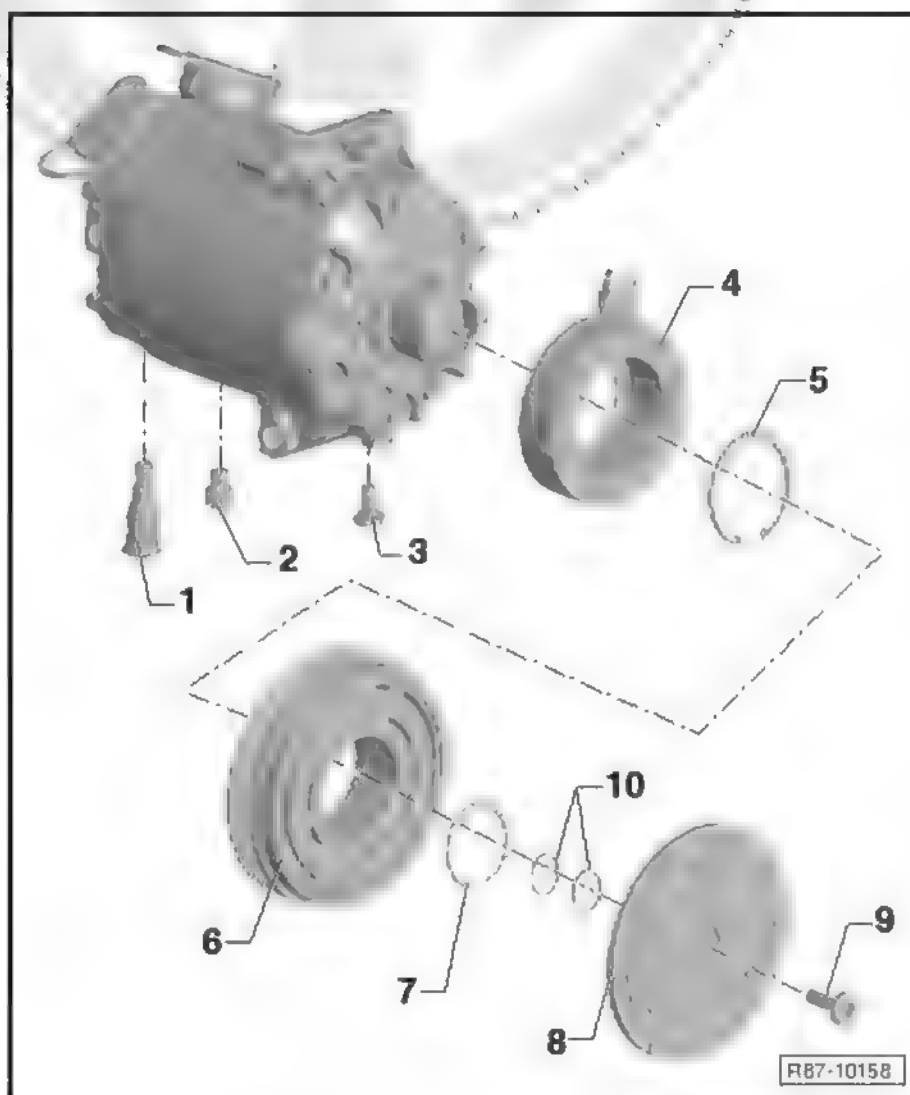


Note

- ◆ In order to repair the Air conditioning magnetic clutch - N25- , with the compressor installed, it is not necessary to open the refrigerant circuit.
- ◆ Only in exceptional or extreme situations, the magnetic clutch may be repaired with the compressor installed.
- ◆ If the compressor must be removed, aspirate the refrigerant with the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment ⇒ Air conditioning with R134a refrigerant; Rep. gr. 00 ; Technical data .

Air conditioning magnetic coupling - N25- - Assembly overview:

- 1 - Control valve with retaining ring set
- 2 - High pressure relief valve set
- 3 - Drainage bolt
 - 16..00.19 Nm.
- 4 - Air conditioning magnetic clutch - N25-
 - Solenoid.
- 5 - Circlip
 - Replace.
- 6 - Pulley
- 7 - Circlip
 - Replace.
- 8 - Coupling disc
- 9 - Screw
 - Always replace when removed.
 - 9.5..000.12 Nm.
- 10 - Adjusting washers

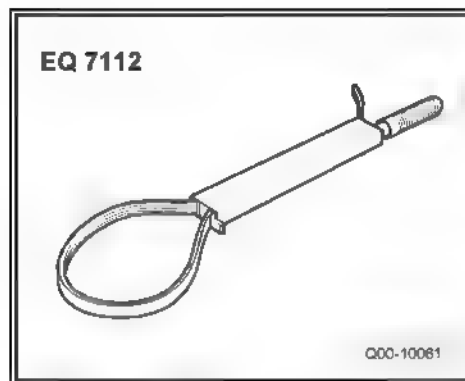


8.3 Electromagnetic clutch (Delphi compressor) - remove and install

Special tools and workshop equipment required



- ◆ Poly-V pulley locking lever - EQ 7112-

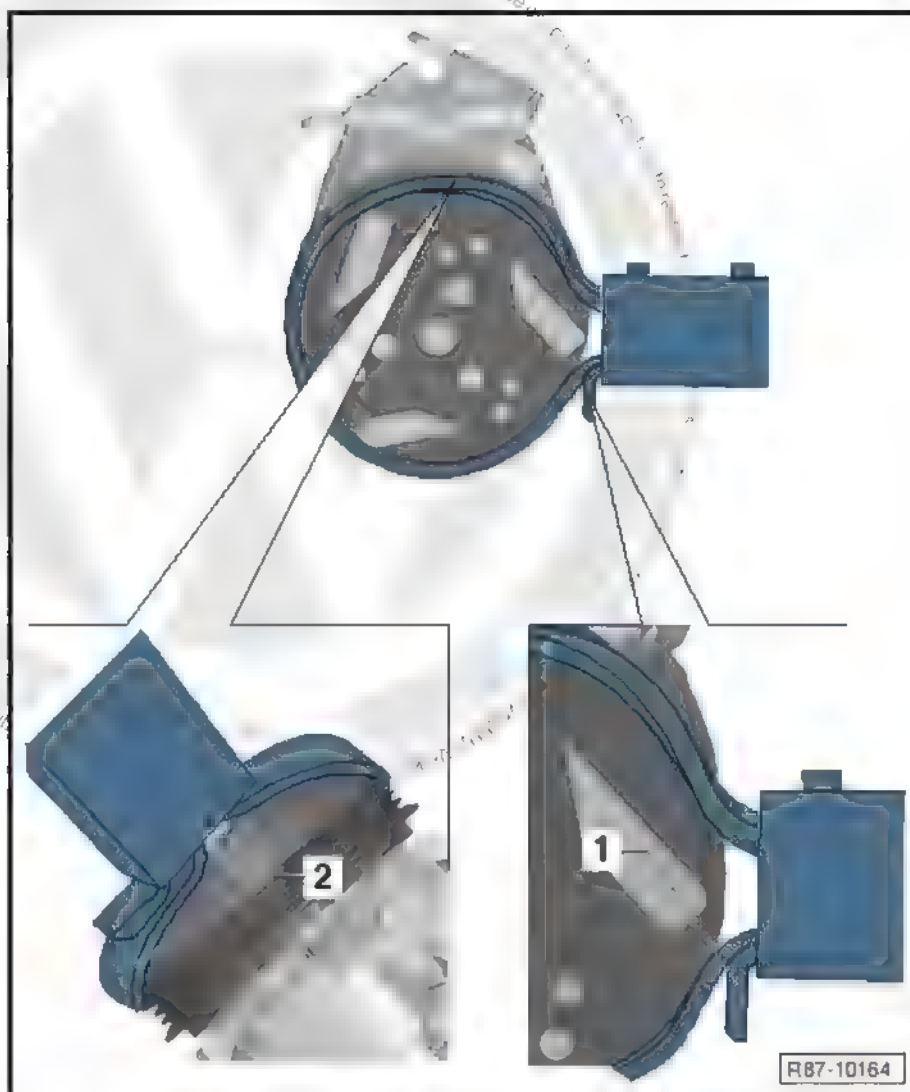


8.3.1 Removal

- Remove horn ⇒ Electrical equipment; Rep. gr. 96 ; Internal lights and lamps, switches, anti-theft protection
- Remove engine power noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Body - Front section .
- Remove right front wheel case cover ⇒ Body - External assembly work; Rep. gr. 66 ; External equipment .
- Remove Poly-V belt ⇒ Cylinder injection engine (1.0l); Rep. gr. 13 ; Engine - mech. crankshaft, plungers .
- Disconnect the connector for the Air conditioning magnetic clutch - N25- harness.

Install tool EQ 7112

In order to perform this operation, the tool must be positioned in an angle so that the brake -1- touches the coupler and the belt -2- and has contact both with the coupler and the set pulley.

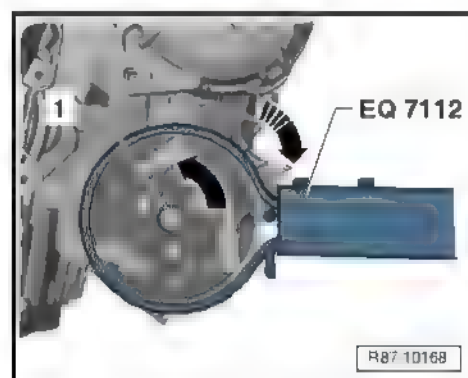


- Loosen the securing bolt -1- in the direction of the -arrow- and simultaneously move the Poly-V Pulley locking rod - EQ 7112- clockwise as indicated by the -arrow- in order to remove the coupling disc.



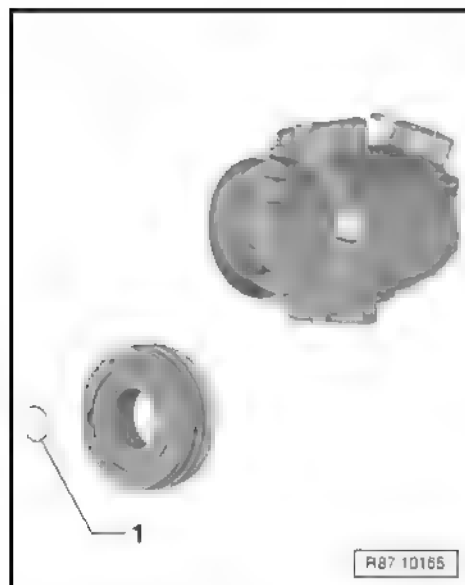
Note

Be careful not to lose the adjusting washers while removing the coupling disc.

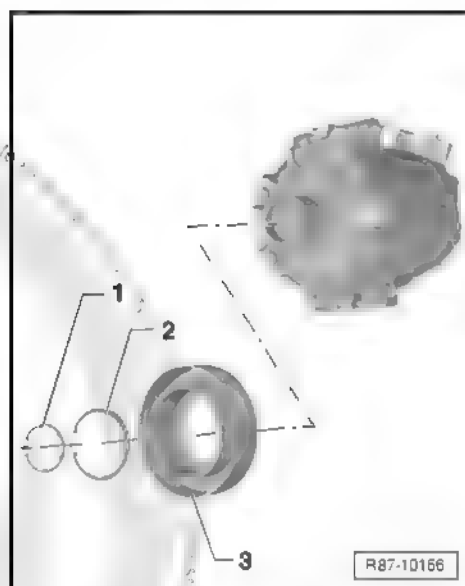




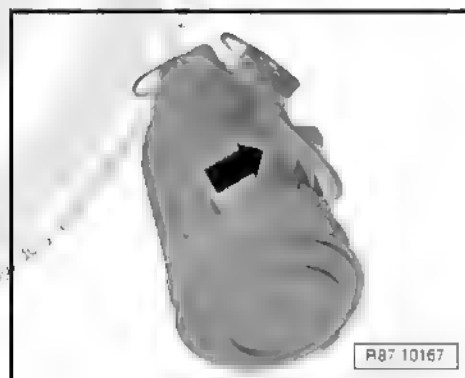
- Remove the lock ring -1-.



- Remove the circlips -1- and -2-, from the Magnetic clutch of the air conditioner - N25- -3-.



- Remove the bolt -arrow- and remove the Air conditioning magnetic coupling - N25- .



8.3.2 Installation

Installation is performed in reverse sequence to the removal, observing the following:

- Install Poly-V belt ➤ Cylinder injection engine (1.0l); Rep. gr 13 , Engine - mech. crankshaft, plungers .



Note

During the installation of the Air conditioning magnetic clutch - N25-, the pin -B- must be fitted into the cavity -A-.



WARNING

Replace the bolt that fastens the coupling disc to the compressor axle.

- Tighten the securing bolt 1- to (9.5...12 Nm) towards -arrow- while moving the Locking rod for Poly-V Belt - EQ 7112- anticlockwise, as indicated by -arrow-.



Note

In case of replacing the coupling disc and/or Air conditioning magnetic clutch - N25-, use the proper number of adjustment washers.

To do so, check the distance between the coupling disc and the pulley.

Inspection of gap between clutch and pulley:

- Check the gap between clutch and pulley with a feeler gauge.

The gap between clutch and pulley must be inspected at 3 different points, spaced at 120° from one another -arrows-.

Between clutch and pulley, obtain a gap of 0.3... 0.9 mm.

The average among the 3 measurements taken must be less than 0.6 mm.

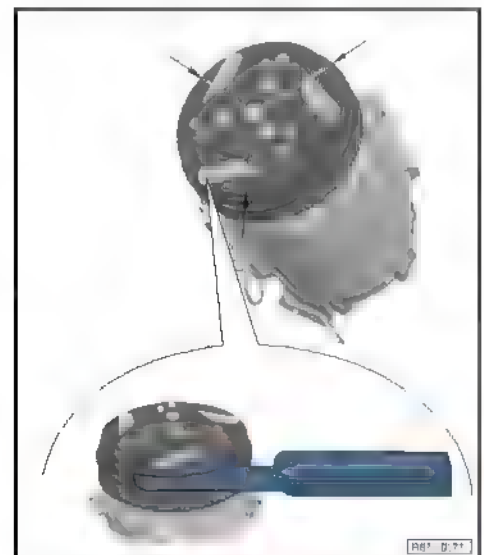
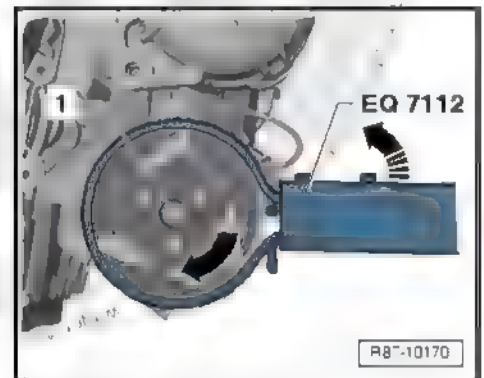
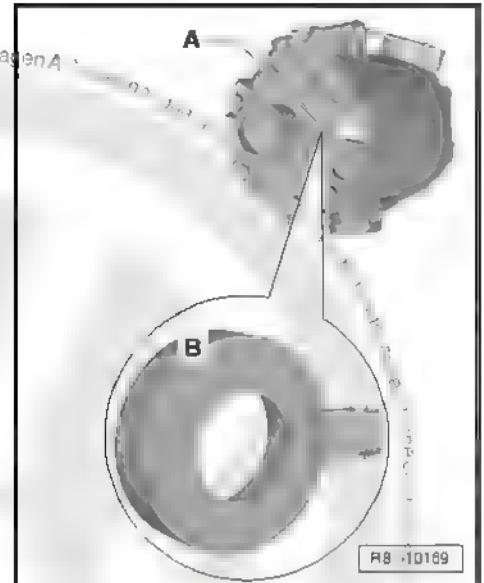
The inspection procedure must be repeated until the specified gap is reached.

- Start the engine.
- Activate the compressor by turning the air conditioner on.

The compressor must remain on for 15 sec., and off for 15 sec. This operation must be repeated 5 times.

- Inspect again the space between clutch and pulley.

If the space is not in accordance with the specifications, repeat the inspection procedure completely



8.4 Air conditioner compressor for EA211 1.0-litre engines (Bluemotion) - general assembly overview



1 - Air conditioning compressor

2 - Low-pressure refrigerant line

3 - M8x28 screw

□ 25 Nm

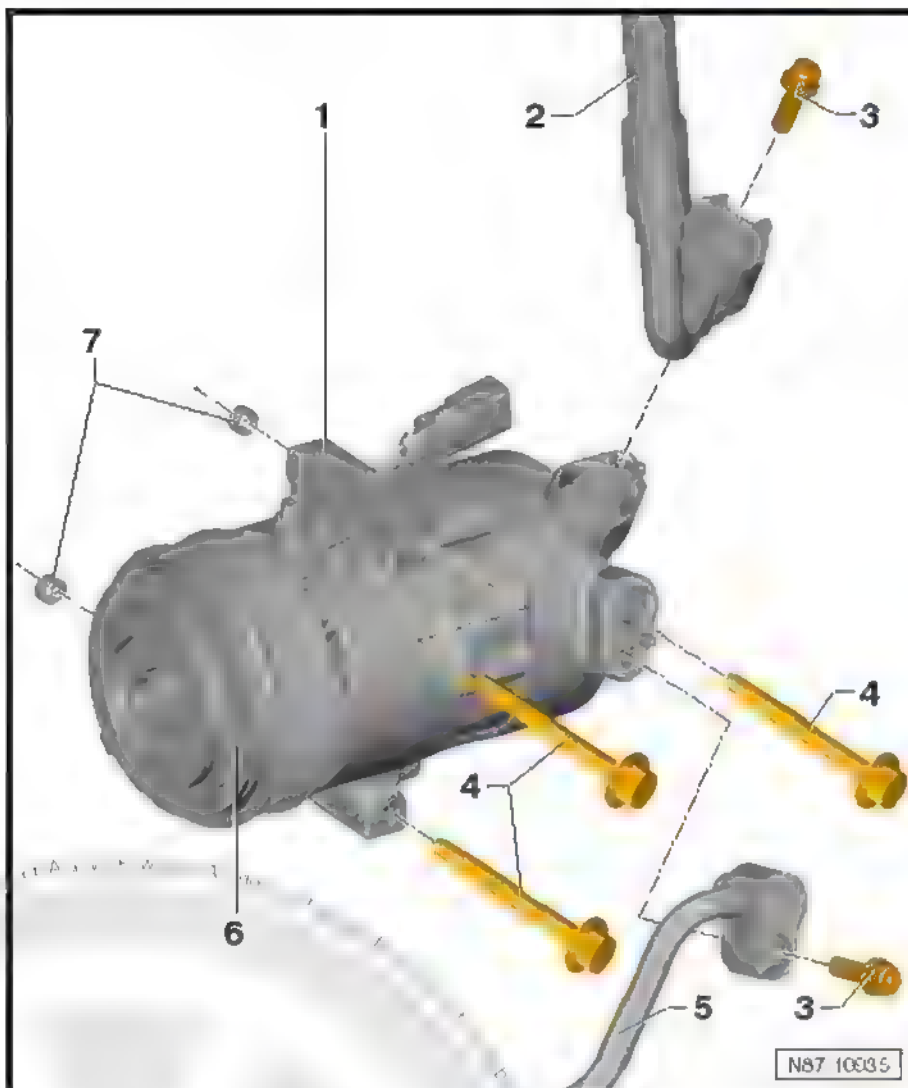
4 - M8x100 bolt

□ 23 Nm

5 - High-pressure refrigerant line

6 - Air conditioning magnetic coupling - N25- -N25- with connector

7 - Guide sleeves



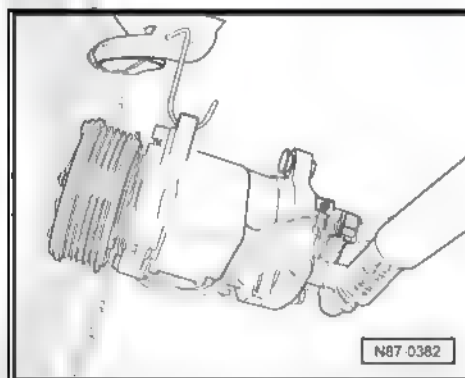
Fastening the air conditioner compressor to the body:

If the air conditioning compressor is removed and the cooling gas loop is not opened, the compressor must be fastened to the body with a suitable auxiliary mean, such as a wire. If it is necessary to fully remove the compressor, refer to [page 81](#).



Note

Make sure that the flexible refrigerant hoses on the compressor remain unstressed.





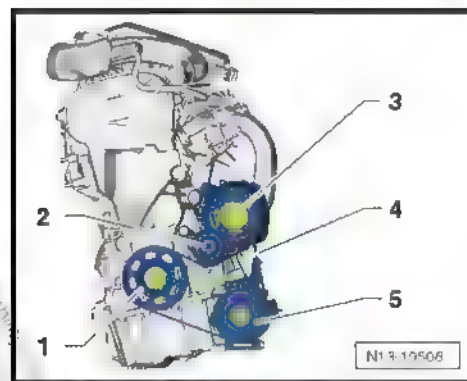
Poly-V belt routing

- 1 - Crankshaft pulley (vibration damper).
- 2 - Tensioner.
- 3 - Generator (Alternator) - C- pulley
- 4 - Poly-V belt.
- 5 - Air conditioning compressor pulley.



Note

When installing the belt, ensure that the pulley is correctly positioned.



8.5 Compressor - remove and install



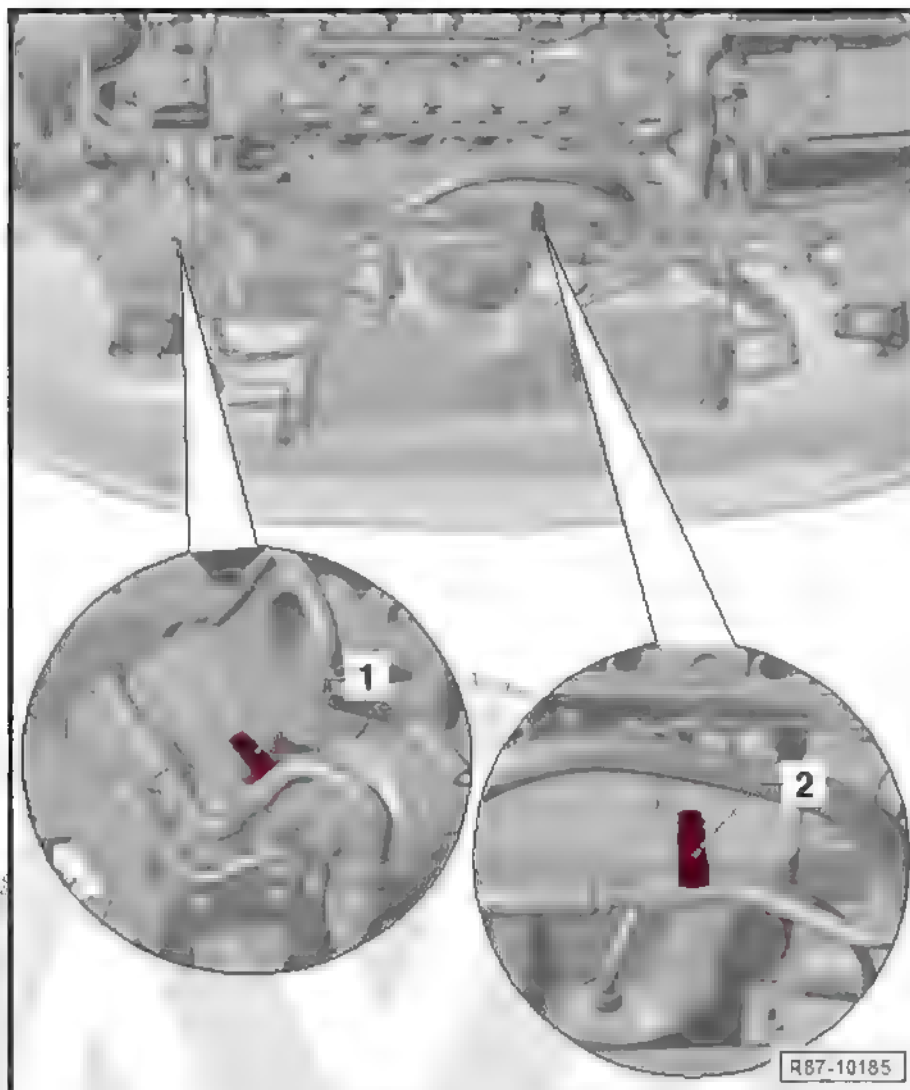
WARNING

When replacing the compressor, carefully remove the closing plug, so as to avoid releasing pressure gas. This will prevent the oil in the compressor from leaking.

The compressor should be installed with the same amount of oil previously in it ⇒ Air conditioning with R134a refrigerant gas; Rep. gr. 00 ; Technical data .

8.5.1 Removal

- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098, or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ⇒ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .

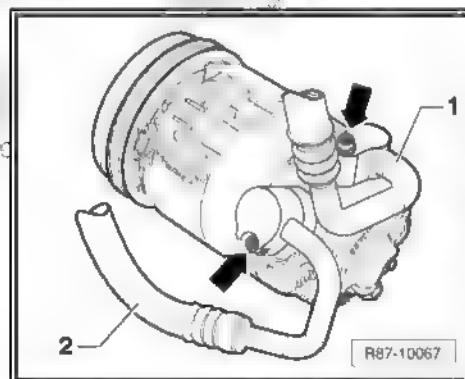


- Remove right front wheel case cover ⇒ Body - External assembly work; Rep. gr. 66 ; External equipment .
- Mark the belt operating direction.
- Remove Poly-V belt ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .
- Disconnect the harness connector from electromagnetic clutch.
- Release the securing bolts -arrows- and remove refrigerant hoses -1- and -2- from the cooling system.



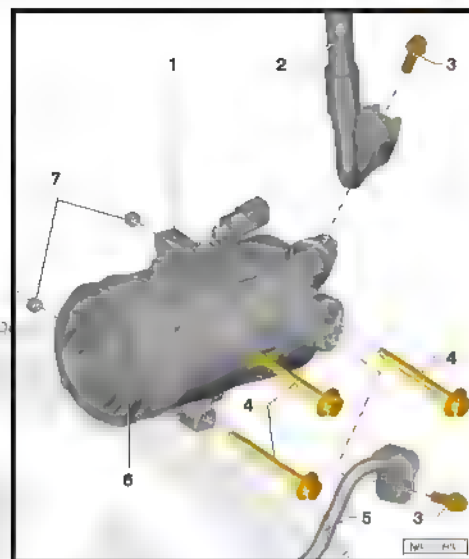
Note

All refrigerant circuit components that are open must be closed with proper plugs to prevent humidity from entering them.





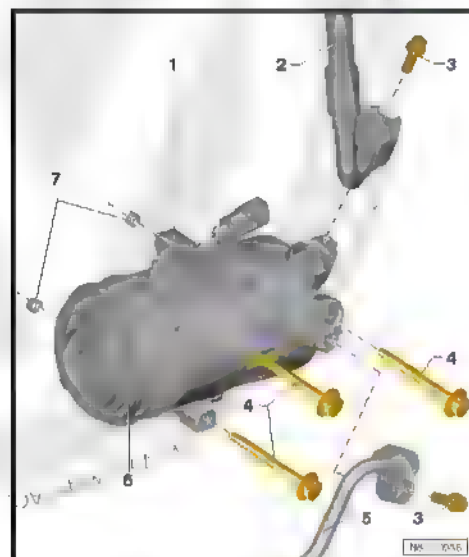
- Remove fastening screws -4- from the compressor -1-.
- Remove the compressor.



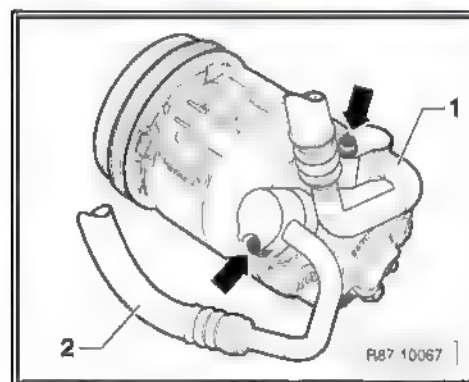
8.5.2 Installation

Installation is performed in reverse sequence to the removal, observing the following:

- Tighten the fastening screws -4- to the compressor -1-.



- Remove the refrigerant hoses -1- and -2-.
- Tighten the fastening screws -arrows-.
- Observe the fastening screw tightening sequence:
- ♦ EA111 engines ⇒ [page 67](#)
- ♦ EA211 Engines (Bluemotion) ⇒ [page 79](#)





8.5.3 Indications to install new compressor



WARNING

Use different refrigerant gas oils and feeding quantity due to the type of compressor used.

For example, 70 cm³ of refrigerant gas oil have been removed from the damaged compressor and 220 cm³ from the replacement compressor (there is a small amount of refrigerant gas oil that remains in the compressor). In this case, fill the replacement compressor (which will be mounted), with 70 cm³ of refrigerant gas oil (do not reuse the refrigerant gas oil contained in the damaged compressor).

After filling the cooling circuit with gas, do not start the engine.

- After installing a new compressor or filling with new refrigerant oil (for example, after purging the refrigerant circuit), turn Poly-V belt manually 10 times, before starting the engine. This prevents damages to the compressor.



Note

Run the engine only with the refrigerant circuit closed.

- Start the engine with the compressor off and wait for engine rotation to stabilize while on idle.
- Open the instrument panel air baffles.
- In the air conditioning adjustment mechanism, select the position "Low" in the temperature selector, which corresponds to the lowest temperature in the system.
- Turn on the compressor (air conditioning) and allow it to operate for 5 minutes with the engine on idle.



Note

- ◆ *Run the engine only with the refrigerant circuit closed in order not to damage the compressor.*
- ◆ *To prevent damages on the compressor, it is equipped with "internal oil circuit". To enable this internal lubrication, the compressor must have a residual quantity of refrigerant lubricant, since when there is no gas in the system, the refrigerant lubricant is not carried to the compressor.*
- ◆ *The Adjustment valve for the air conditioner compressor - N280- is not activated when the refrigerant circuit is empty. The compressor will turn in vain, following the engine speed regime*
- ◆ *If a compressor is locked, the overload protection is released from the compressor shaft. This can be observed when deformations are detected in the Poly-V belt, which are not always noticed, or by the presence of rubber dust in the Poly-V belt (elastic) grooves.*

If the engine must be started with the cooling system without gas, observe the following items:

- ◆ The refrigerant circuit must be completely installed and closed.

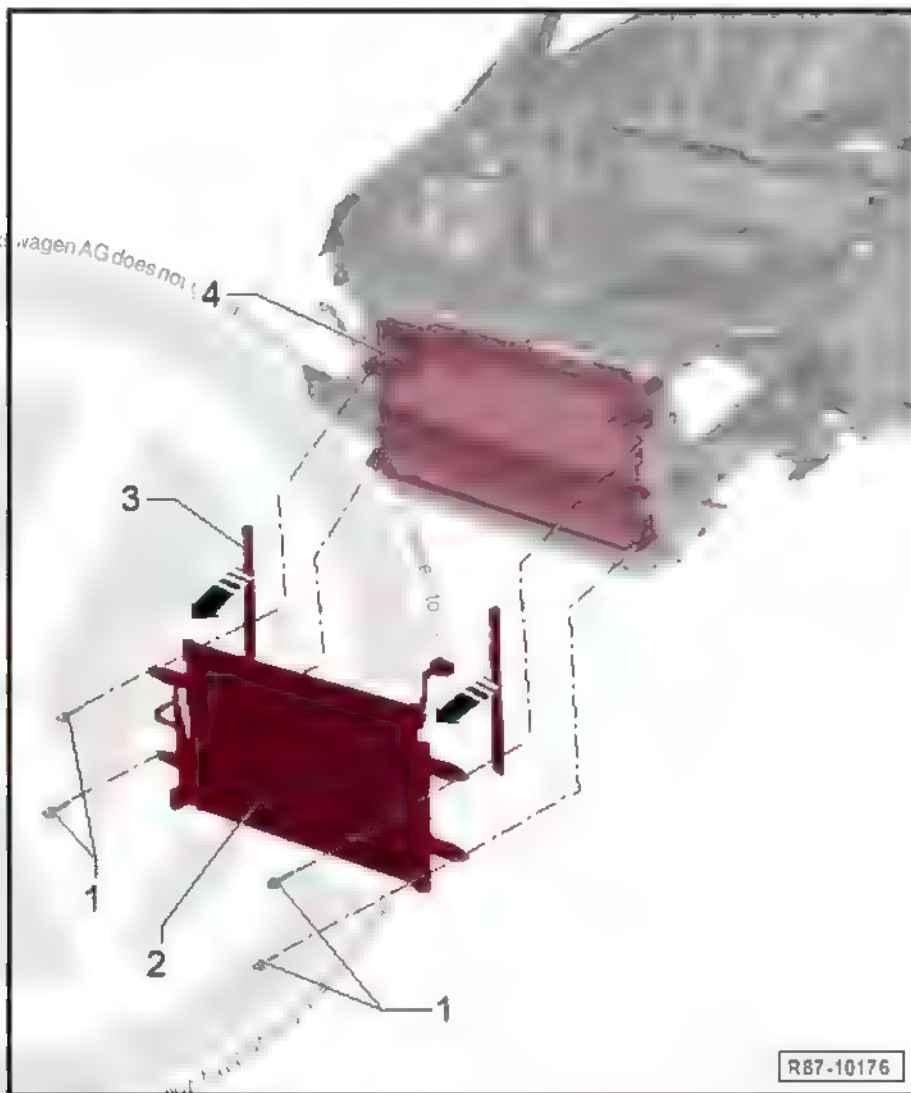


- ◆ The compressor must have at least one quarter of the oil level expected for the refrigerant.
- ◆ Engine rotations should not exceed 2500 rpm.
- ◆ Run the engine only for the time strictly required.

8.6 Condenser

General overview assembly (Delphi condenser):

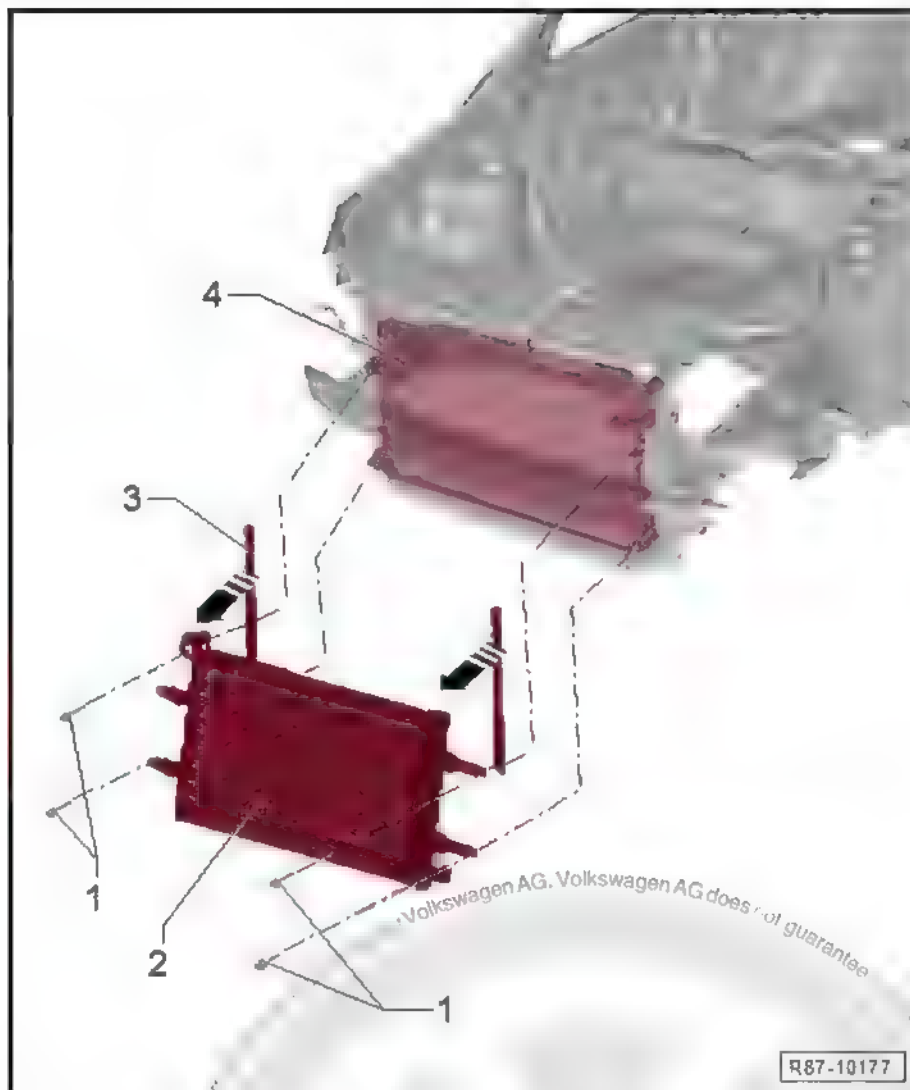
- 1 - Screws
 - ☐ 4 units
 - ☐ 5 Nm
- 2 - Dryer filter receiver
 - ☐ Remove and install
⇒ [page 95](#)
- 3 - Sealing
 - ☐ Replace if damaged
- 4 - Radiator
- 5 - Condenser
 - ☐ Manufacturer "Delphi"
 - ☐ Remove and install
⇒ [page 86](#)



General overview of assembly (Denso condenser):



- 1 - Screws
 - ☐ 4 units
 - ☐ 5 Nm
- 2 - Dryer filter receiver
 - ☐ Remove and install
→ [page 95](#)
- 3 - Sealing
 - ☐ Replace if damaged
- 4 - Radiator
- 5 - Condenser
 - ☐ Manufacturer "Denso"
 - ☐ Remove and install
⇒ [page 90](#)



8.6.1 Condenser (Delphi) - remove and install

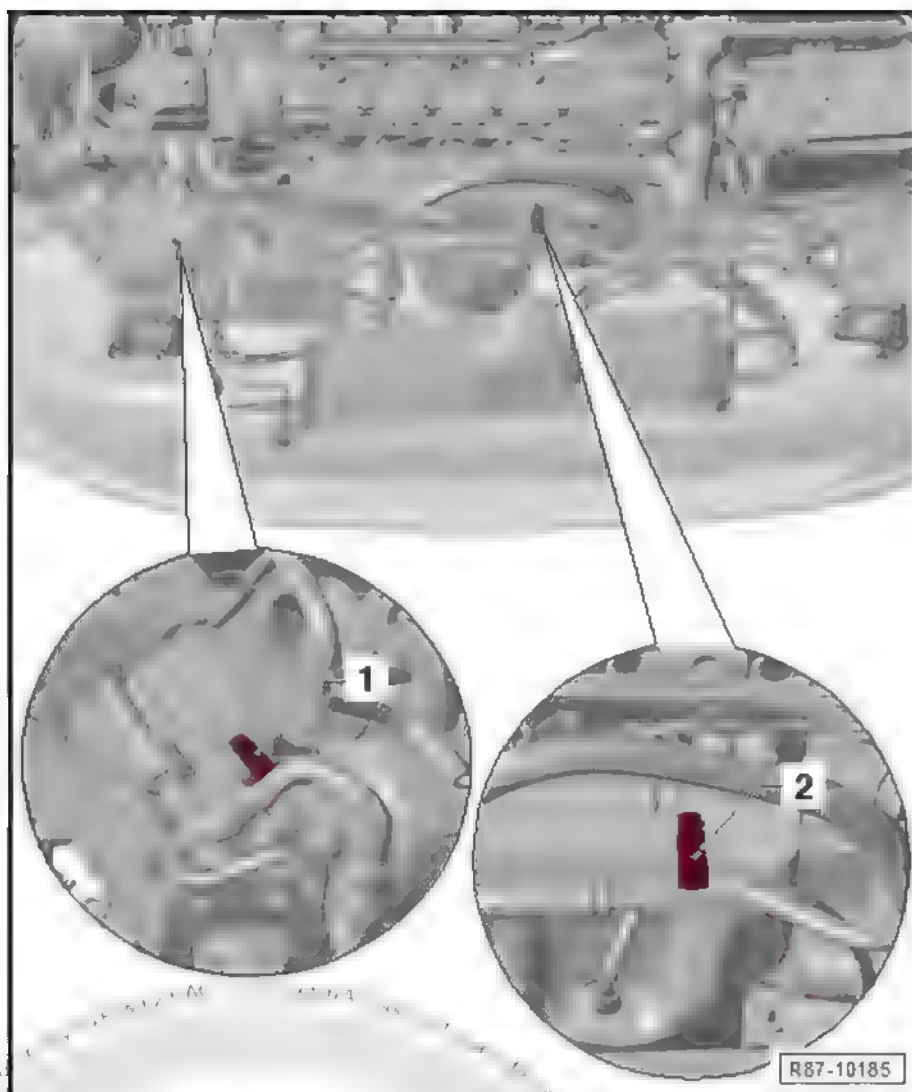
Removal:

- Turn off the ignition and all electrical equipment, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ Electrical devices; Rep. gr. 27 ; Starter motor, alternator, battery .



Note

- ◆ Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.
- ◆ When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.
- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ➤ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .



Note

- ◆ *Contaminating the environment with refrigerant is a punishable offence.*
- ◆ *All refrigerant circuit components that are open must be closed with proper plugs to prevent humidity from entering them.*
- Remove the front bumper protector ⇒ Body - External assembly works; Rep. gr. 63 ; Bumpers .

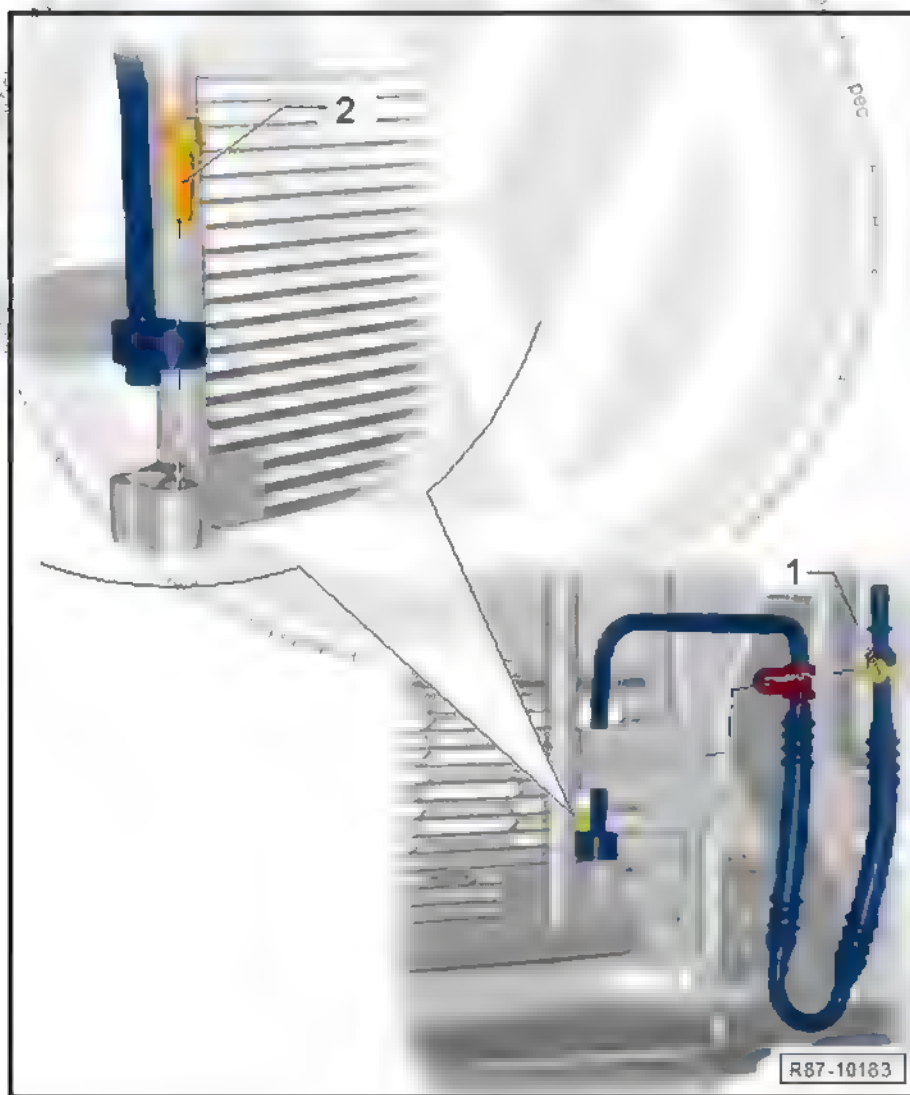
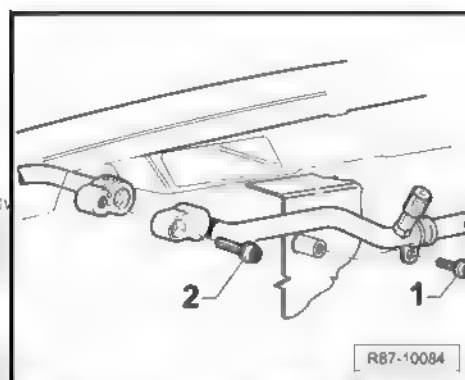
For vehicles with EA111 engines:

- Install front panel in the "service position" ⇒ General body repairs, exterior; Rep. gr. 50 ; Body - Front section .

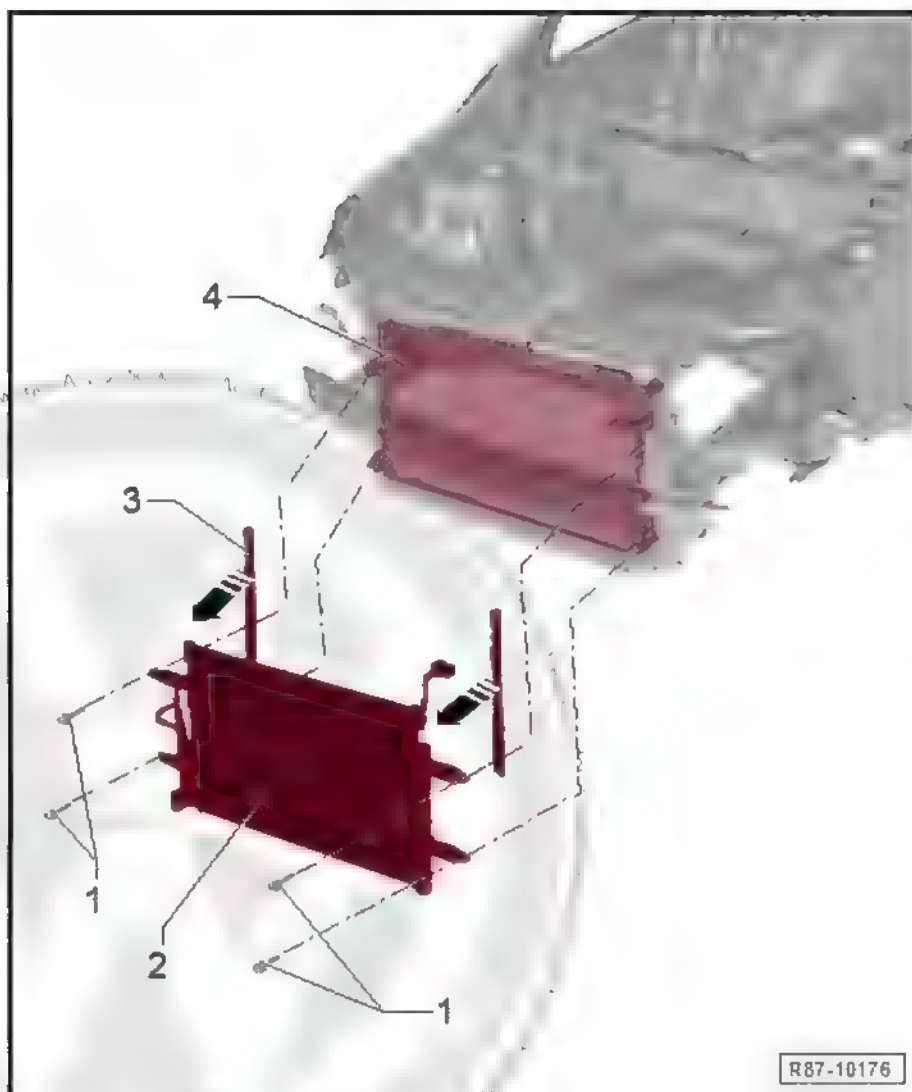


Continuation for all vehicles:

- Remove the belt attachment screw -1- .
- Remove the attachment screw -2- from the set of lines.
- Remove the belt attachment screw -1- .



- Remove the attachment screw -2- from the set of lines.
- Remove the Radiator Fan - V7- ⇒ Engine; Rep. gr. 19 ; Cooling system
- Remove fastening screws -1- from the condenser -5-.



- Remove the radiator and carefully lift it away from the front panel⇒ Engine; Rep. gr. 19 ; Cooling system



WARNING

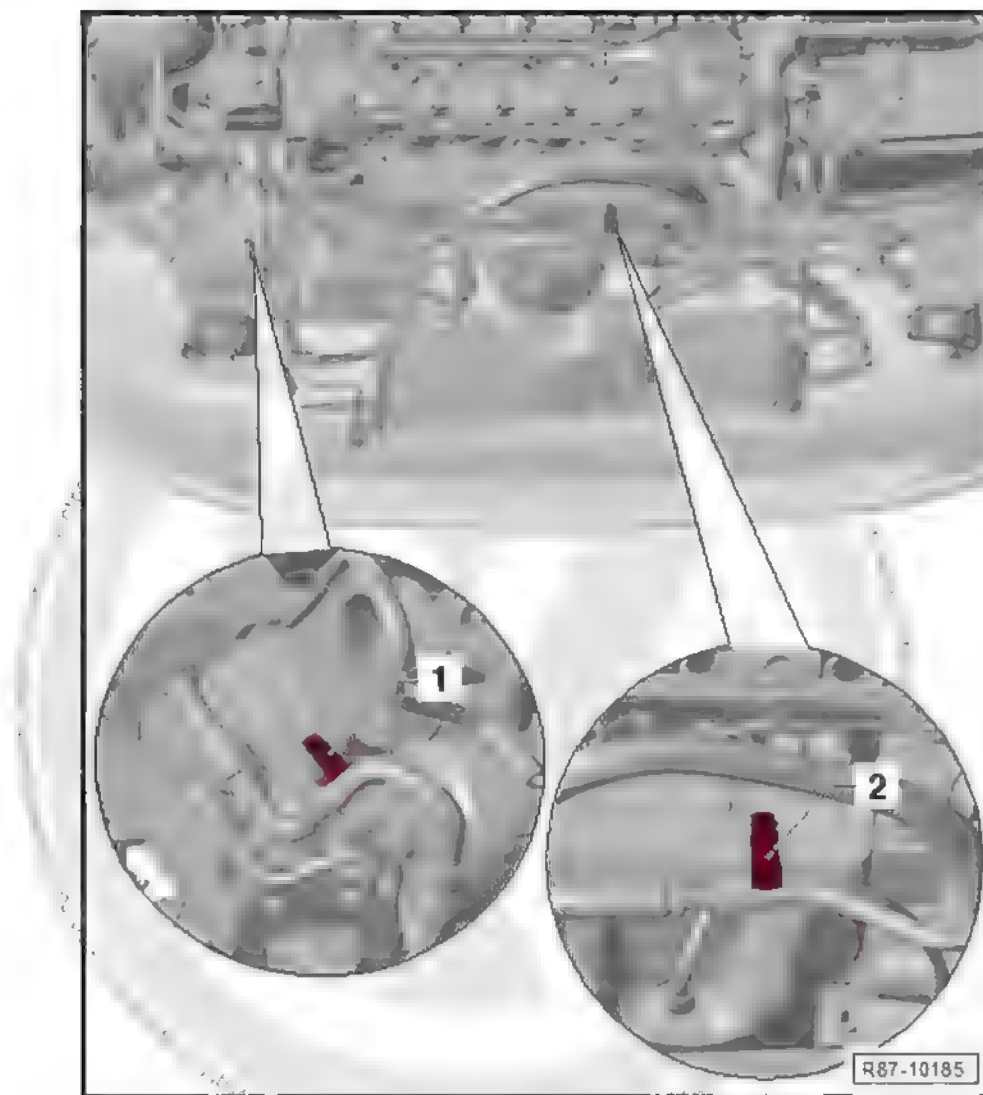
Liquid should not be drained from the cooling system

- Remove the condenser -5-.

Installation:

Installation is performed in reverse sequence to the removal, observing the following.

- Tighten fastening screws of the condenser with $(5 \pm 0,5 \text{ Nm})$ of torque.
- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas → Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .



- Check the amount of gas supplied ➔ [page 117](#) .

8.6.2 Condenser (Denso) - remove and install

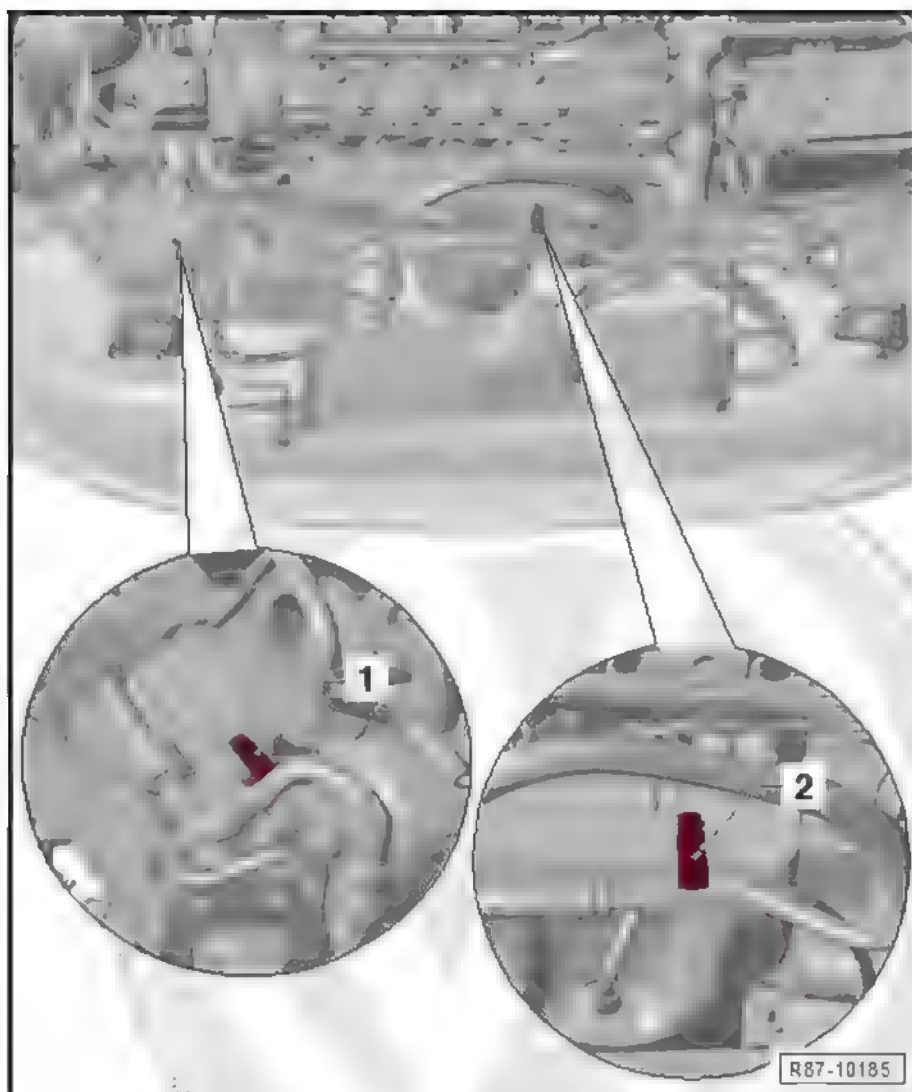
Removal:

- Turn off the ignition and all electrical equipment, and remove the key from ignition.
- Disconnect the Battery - A- ➔ Electrical devices; Rep. gr. 27 ; Starter motor, alternator, battery .



Note

- ♦ *Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.*
- ♦ *When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.*
- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ➔ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .

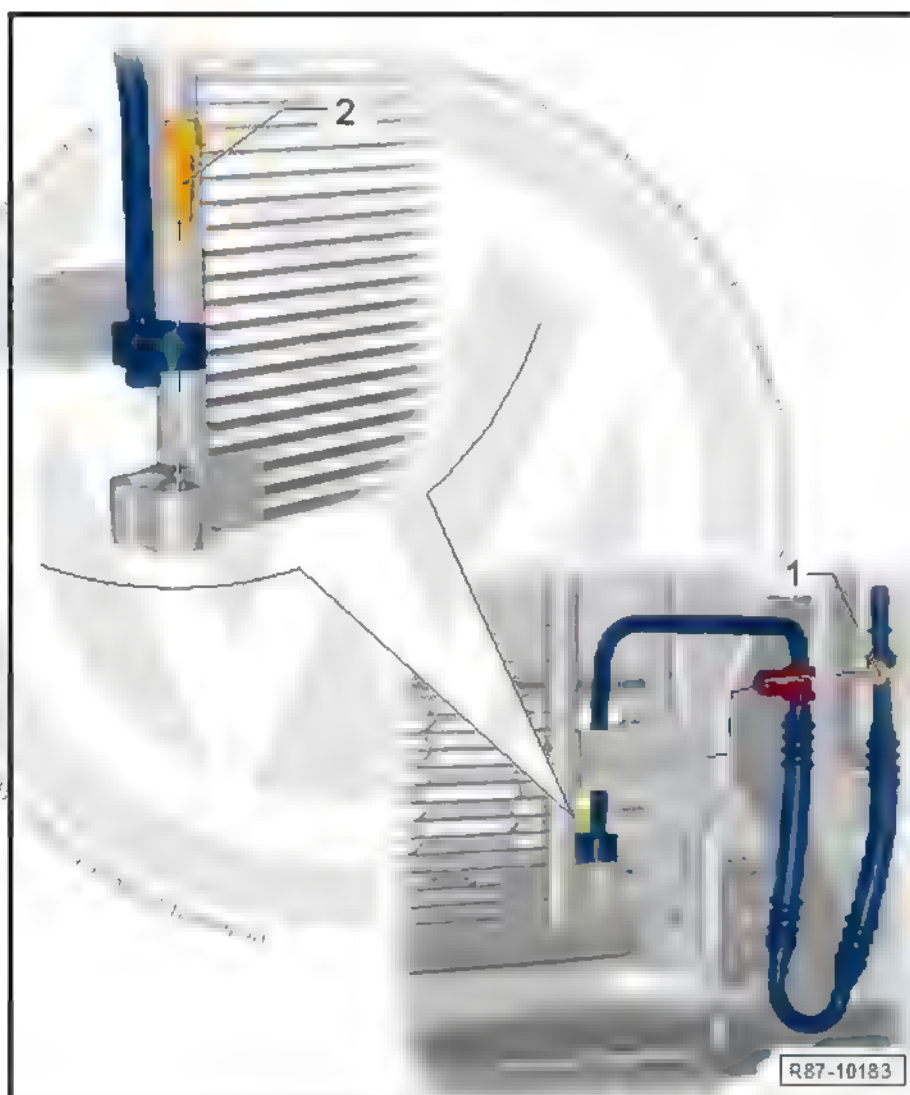
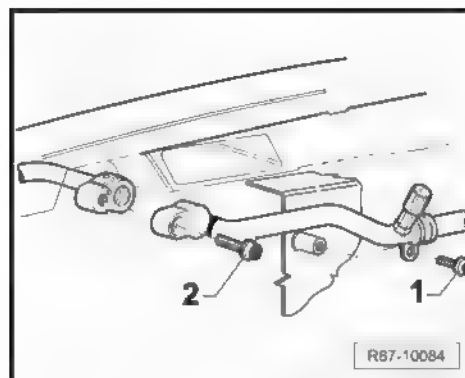


Note

- ◆ *Contaminating the environment with refrigerant is a punishable offence.*
- ◆ *All refrigerant circuit components that are open must be closed with proper plugs to prevent humidity from entering them.*
- Remove the front bumper protector ⇒ Body - External assembly works; Rep. gr. 63 ; Bumpers .
- Install front panel in the "service position" ⇒ General body repairs, exterior; Rep. gr. 50 , Body - Front section .



- Remove the belt attachment screw -1- .
- Remove the attachment screw -2- from the set of lines.
- Remove the belt attachment screw -1- .



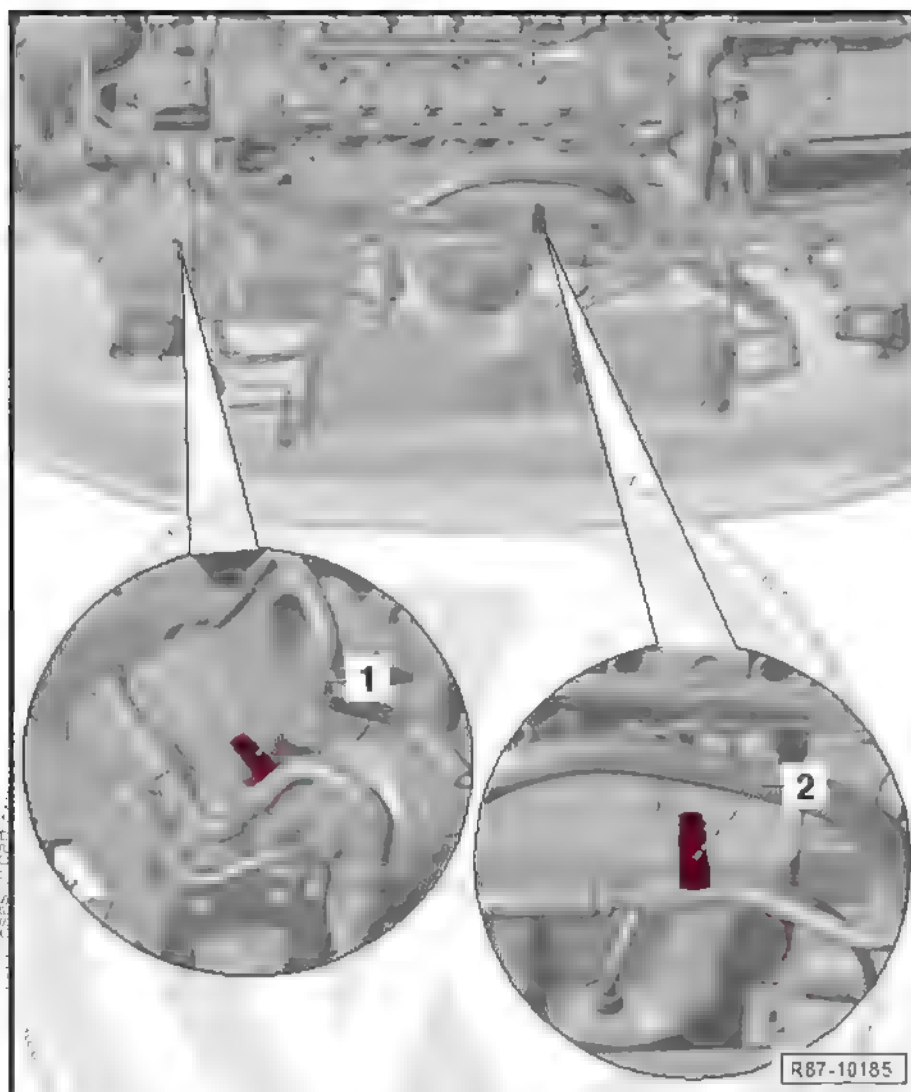
- Remove the attachment screw -2- from the set of lines.
- Remove the Radiator Fan - V7- ➔ Engine; Rep. gr. 19 ; Cooling system
- Remove fastening screws -1- from the condenser -5-.



- 

Liquid should not be drained from the cooling system

- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas → Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .



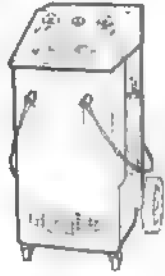
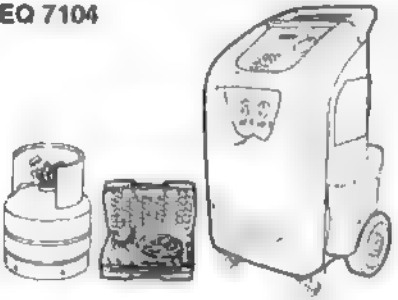
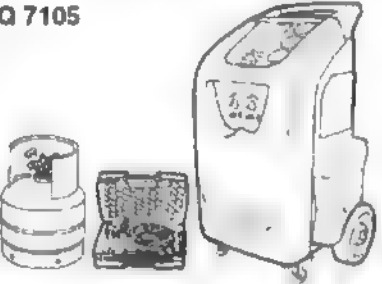
- Check the amount of gas supplied [➤ page 117](#).



8.7 Dryer filter

Special tools and workshop equipment required

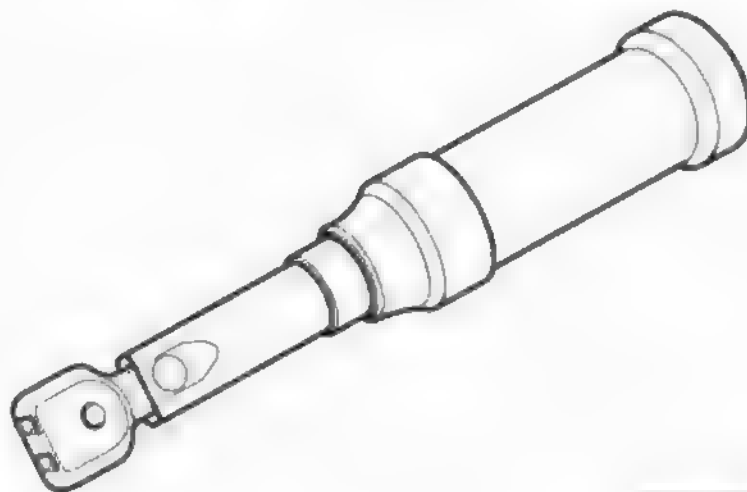
- ◆ Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7104-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7105-

<p>EQ 7098</p> 	<p>EQ 7104</p> 
<p>EQ 7105</p> 	
	<p>Q87-10002</p>



- ◆ Torque wrench 2 to 10 Nm
- VAG 1783-

V.A.G 1783



Q00-10085

The equipment has a quick-release coupling adapter for service connections on both the high and low pressure sides.



Note

- ◆ *First extract the refrigerant gas with the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment ⇒ Air conditioning with R134a refrigerant gas; Rep. gr. 00 ; Technical data .*
- ◆ *Environmental contamination by the refrigerant is a punishable offence.*
- ◆ *All cooling gas circuit components that are open must be closed with proper plugs to prevent humidity from entering the components.*

8.7.1 Dryer filter (Delphi) - remove and install

Removal:

- Turn off the ignition and all electrical equipment, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ Electrical devices; Rep. gr. 27 ; Starter motor, alternator, battery .



Note

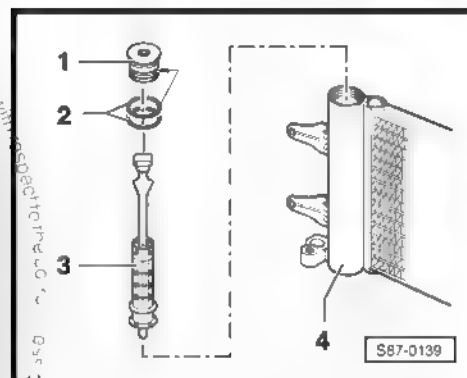
- ◆ *Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.*
- ◆ *When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.*
- Remove the condenser ➔ [page 85](#) .



- Remove the sealing plug -1-.
- Remove the filtering element -3- from the dryer filter receiver -4-.

Installation:

- Replace sealing rings -2-.



- Install filter -3- to the dryer stop -4-.

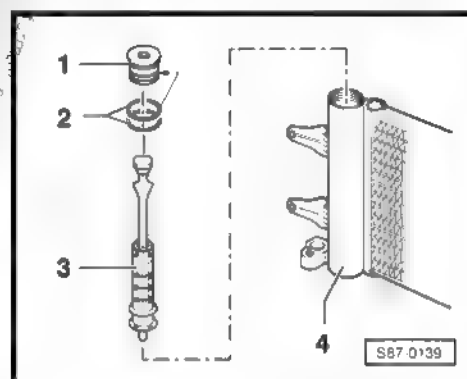
Install new sealing rings -2-, lubricating them with cooling gas oil in the sealing screw -1-.

- Install sealing screw -1-, with 4.5 ± 0.5 Nm of torque.

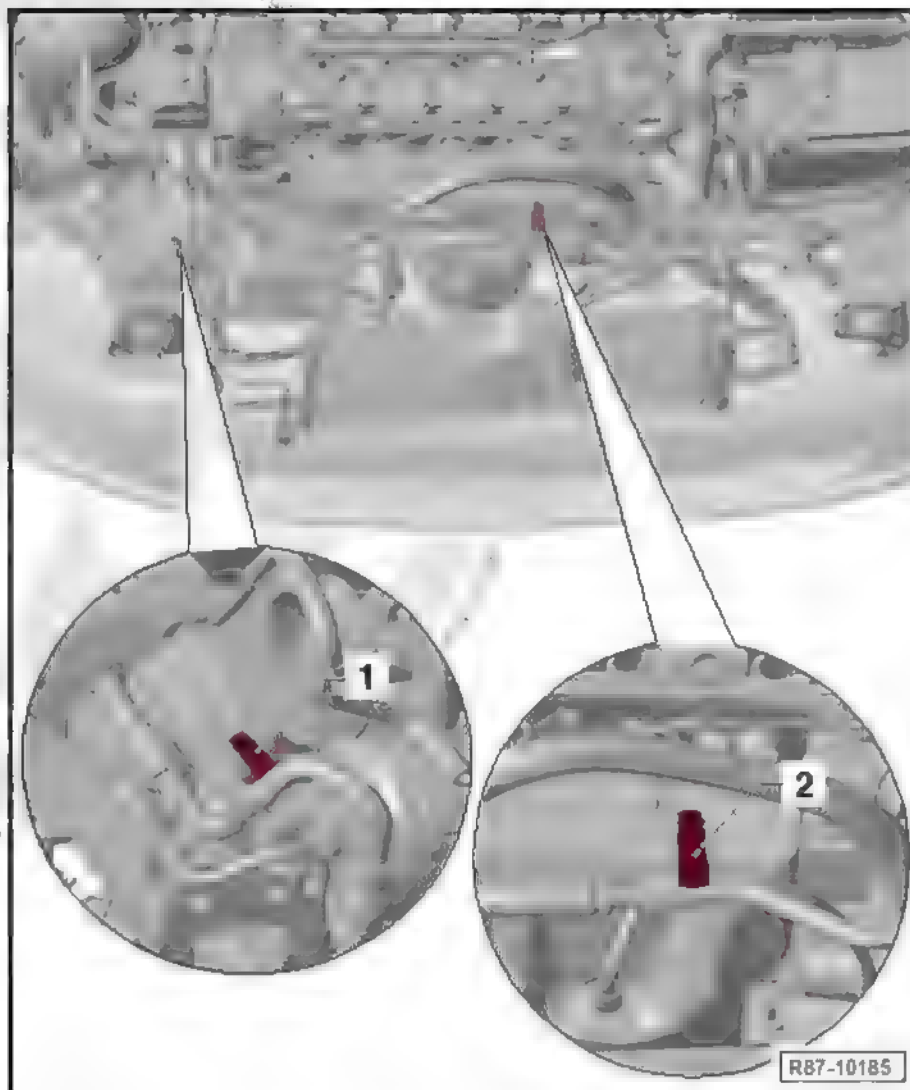


Note

The purpose of the dryer filter is to accumulate droplets of fluid and direct them to the expansion valve in an uninterrupted flow. Humidity that penetrates into the cooling circuit during assembly is absorbed by the dryer filter.



- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ⇒ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .



- Check the amount of gas supplied ⇒ [page 117](#) .

8.7.2 Dryer filter (Denso) - remove and install

Removal:

- Turn off the ignition and all electrical equipment, and remove the key from ignition.
- Disconnect the Battery - A- ⇒ Electrical devices; Rep. gr. 27 ; Starter motor, alternator, battery .



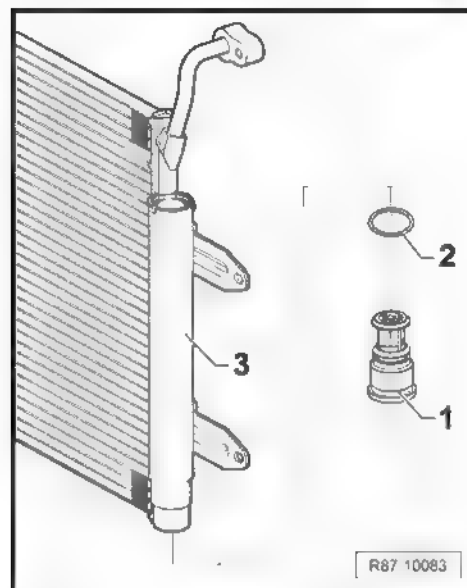
Note

- ♦ Check if the vehicle has a code radio. If so, request the anti-theft code before disconnecting the Battery - A- earth strap.
 - ♦ When the Battery - A- earth strap is reconnected, check vehicle equipment (radio, clock, central locking, electric windows, etc.) according to the repair manual and/or instructions for use.
- Remove the condenser ⇒ [page 85](#)



- Remove the sealing plug -1- with the filtering element

Installation:



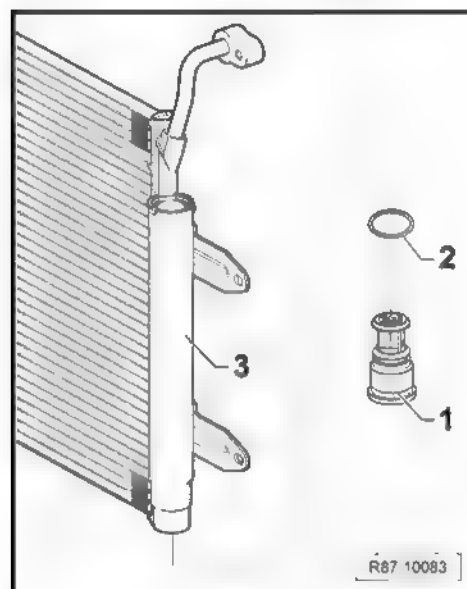
- Replace the sealing ring -2-.
- Install new sealing rings -2-, after lubricating them with cooling gas oil in the sealing screw -1-.
- Install sealing screw -1-, with 3 ± 1 Nm of torque.

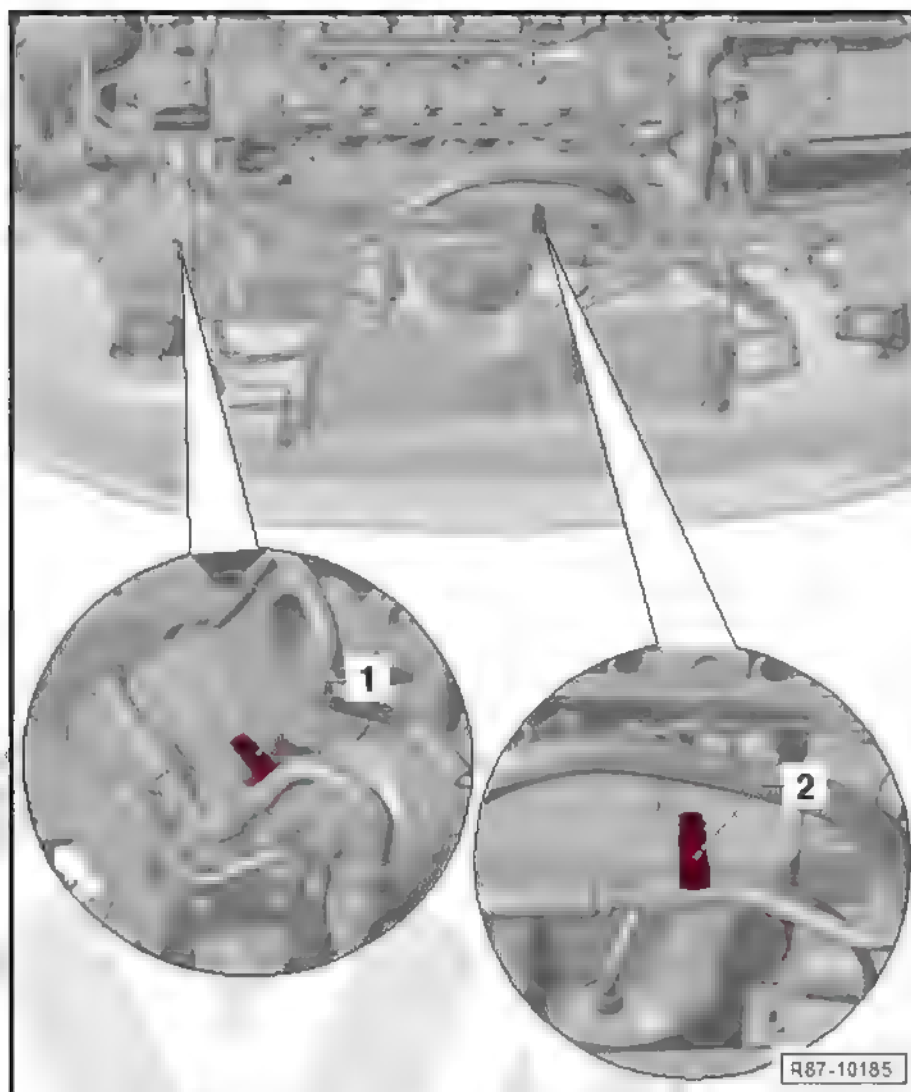


Note

The purpose of the dryer filter is to accumulate droplets of fluid and direct them to the expansion valve in an uninterrupted flow. Humidity that penetrates into the cooling circuit during assembly is absorbed by the dryer filter.

- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ⇒ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .





- Check the amount of gas supplied ⇒ [page 117](#) .



8.8 Expansion valve - remove and install

1 - Evaporator housing/engine compartment partition panel sealing

- ☐ Observe the installation position ⇒ [page 50](#) .
- ☐ Replace if damaged.

2 - Sealing ring

- ☐ Replace
- ☐ 11.10 mm; 1.78 mm

3 - Expansion valve

- ☐ Remove and install
⇒ [page 101](#) .

4 - Sealing ring

- ☐ change
- ☐ 10.8 mm; 1.82 mm

5 - Refrigerant hose

- ☐ High pressure
- ☐ From dryer filter to expansion valve

6 - Refrigerant hose

- ☐ From expansion valve to compressor

7 - Screw

- ☐ 5 Nm

8 - Screw

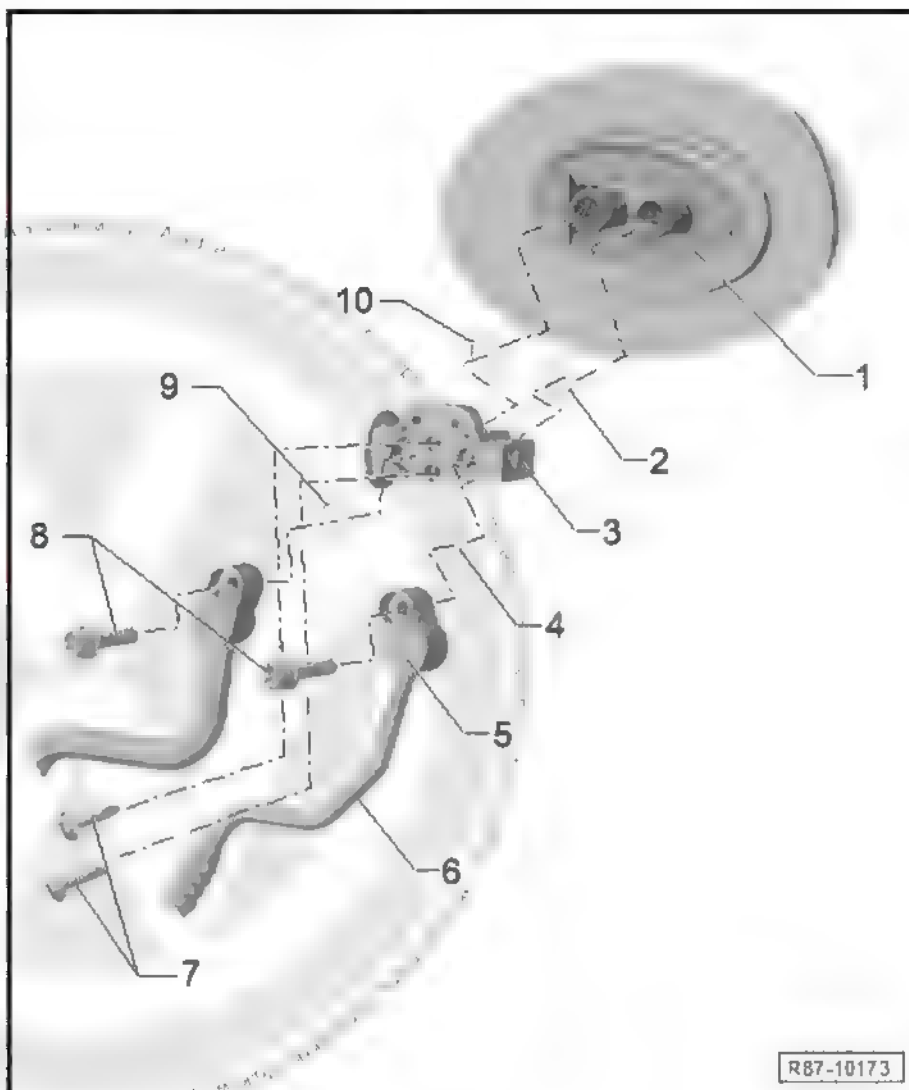
- ☐ 2 units
- ☐ 10 Nm

9 - Sealing ring

- ☐ 14.30 mm; 2.40 mm

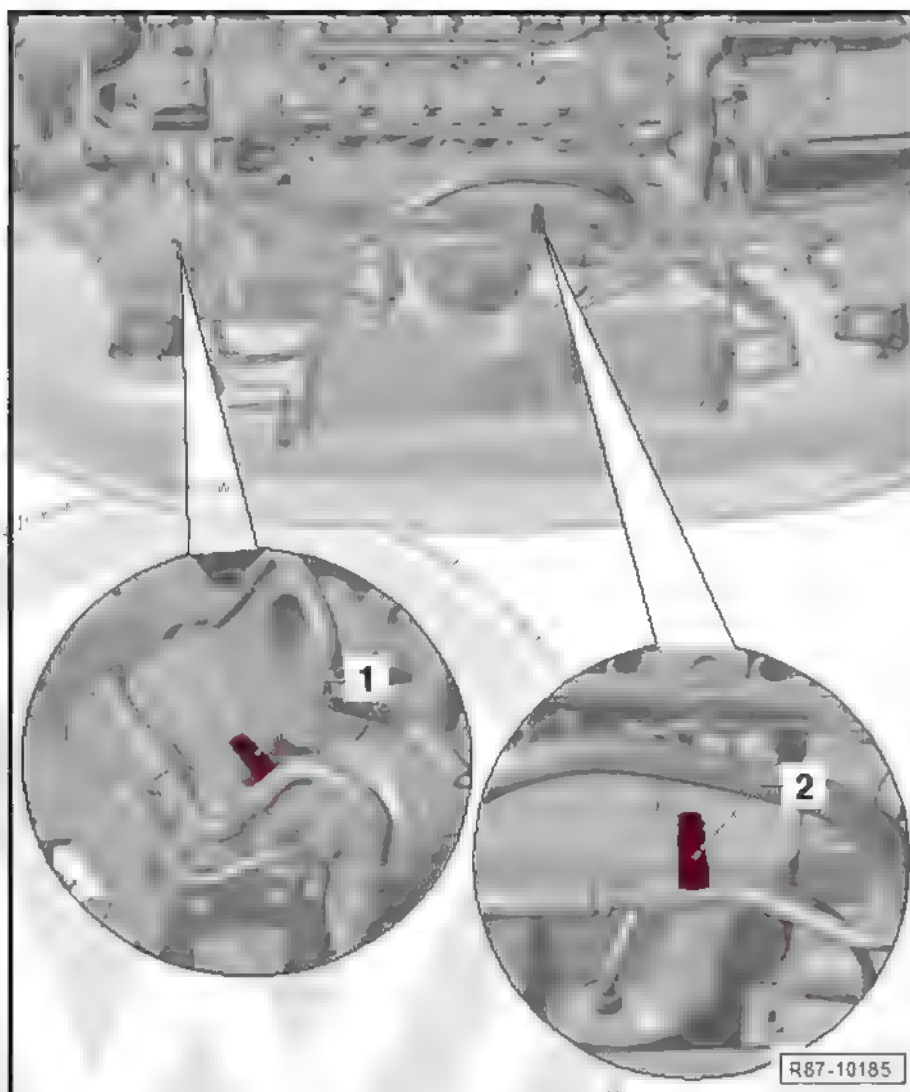
10 - Sealing ring

- ☐ 17.17 mm; 1.78 mm



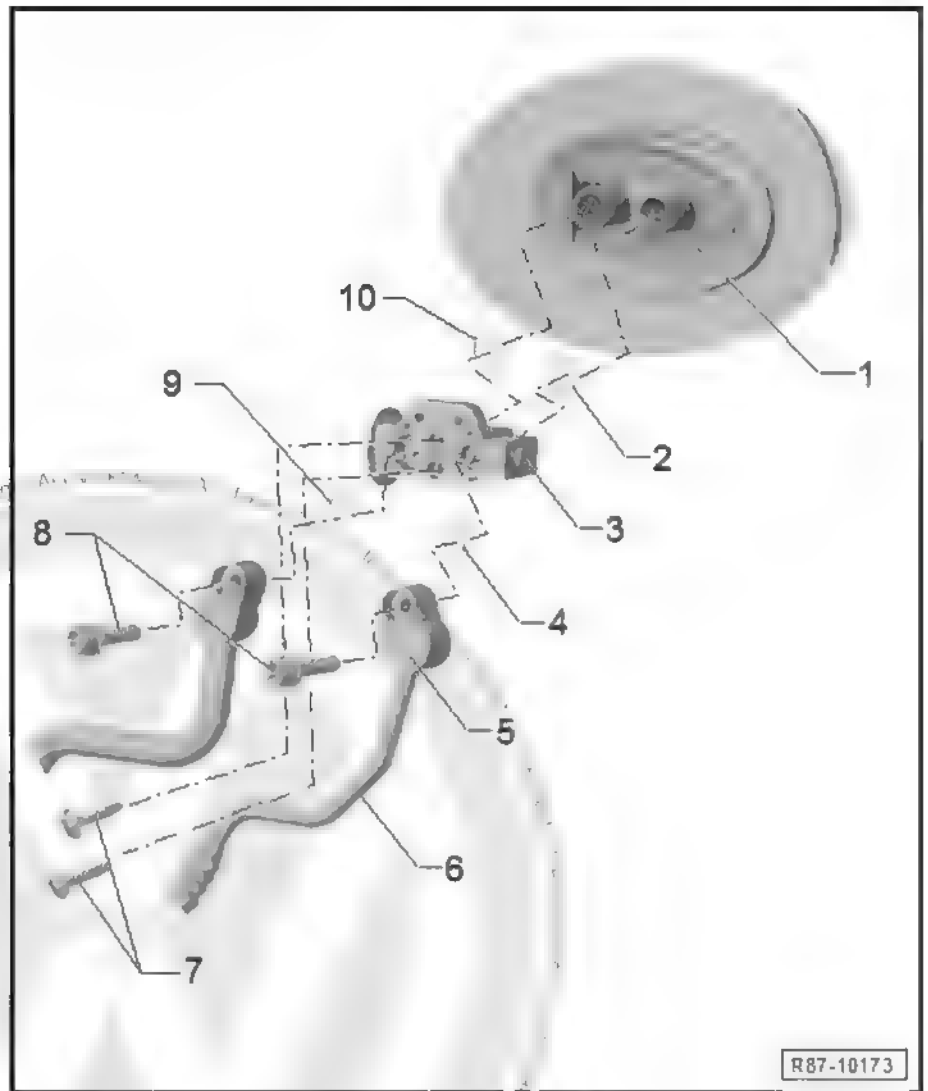
8.8.1 Removal

- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ⇒ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .



Note

- ◆ *Contaminating the environment with refrigerant is a punishable offence.*
- ◆ *All refrigerant circuit components that are open must be closed with proper plugs to prevent humidity from entering them.*
- Remove the screws -8-.



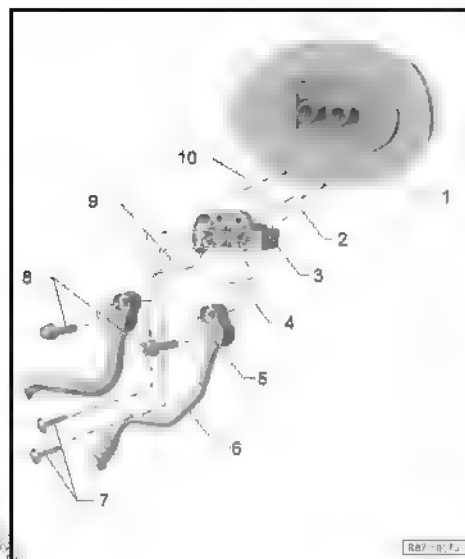
- Remove cooling gas hoses -5 and 6-.
- Remove the screws -7-.
- Remove the expansion valve -3-.

8.8.2 Installation

Installation is performed in reverse sequence to the removal, observing the following:



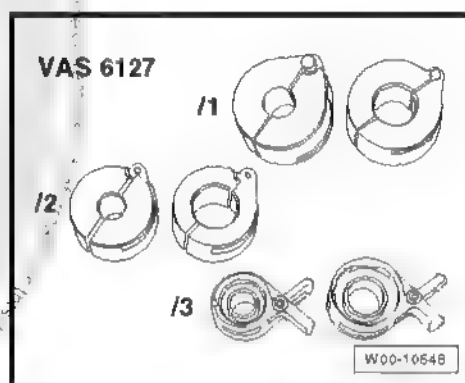
- Replace the sealing rings -2, 4, 9 and 10-
- Tighten screws -7- with 5-Nm torque.
- Tighten screws -8- with 12-Nm torque.



8.9 Quick-release coupling - remove and install

Special tools and workshop equipment required

- ◆ Disconnecter - VAS 6127-



- ◆ Disconnecter - VAS 5231-
- ◆ Disconnecter - VAS 5231/1-
- ◆ Goggles
- ◆ Sleeves

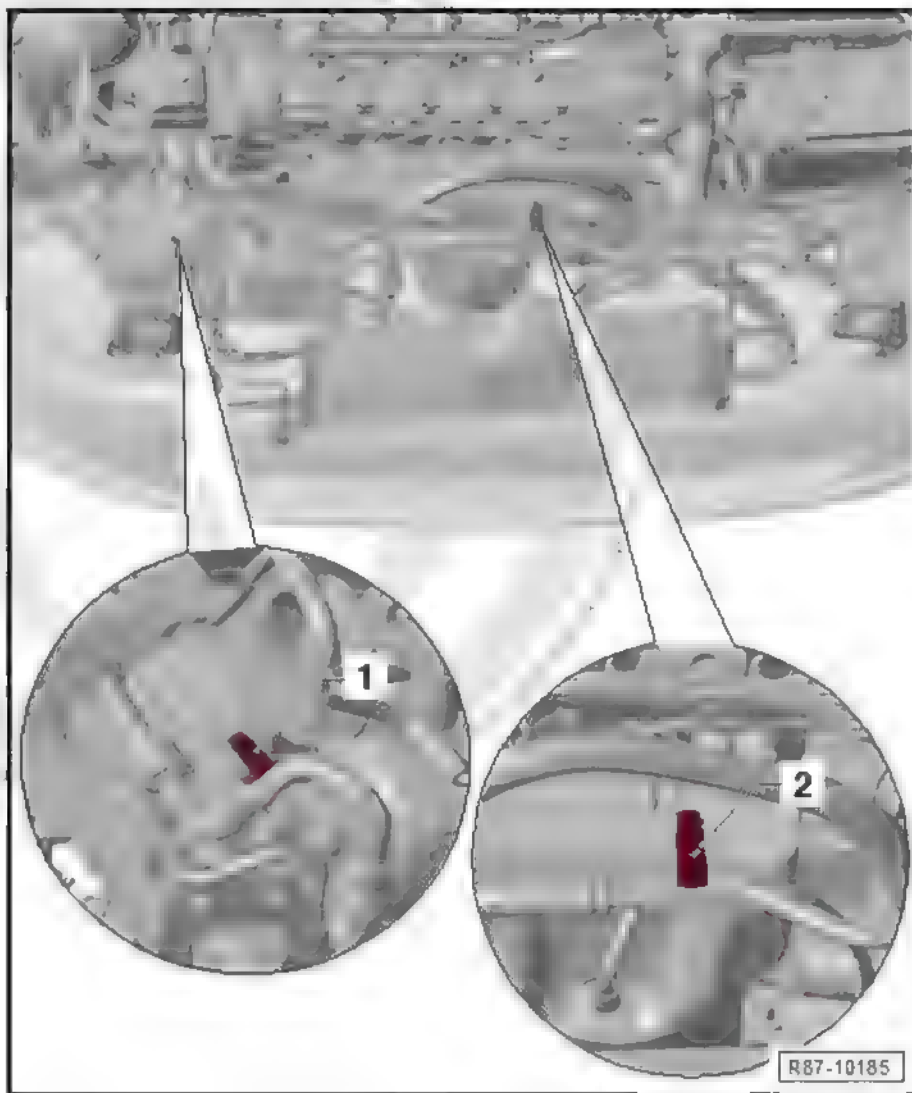
8.9.1 Quick-release coupling removal



Note

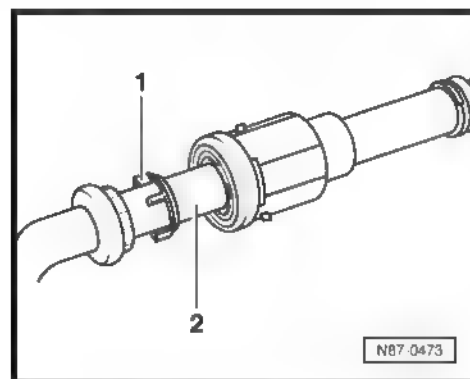
After every removal, the sealing ring, locking insert and safety ring must be replaced.

- Connect the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment to the service valves -1- and -2- of the cooling gas circuit and aspirate all the gas ⇒ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Technical data .



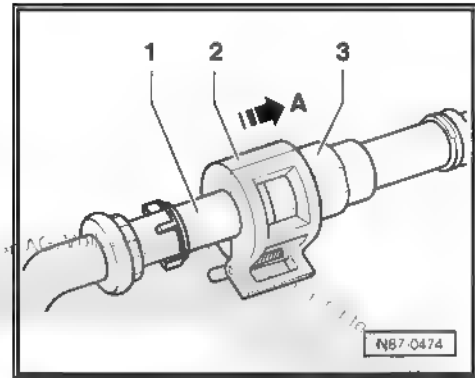
Note

- ◆ *Contaminating the environment with refrigerant is a punishable offence.*
- ◆ *All refrigerant circuit components that are open must be closed with proper plugs to prevent humidity from entering them.*
- Displace the sealing boot -1- from the coupling of the refrigerant pipes -2-, so that the assembly area is freed from the coupling.

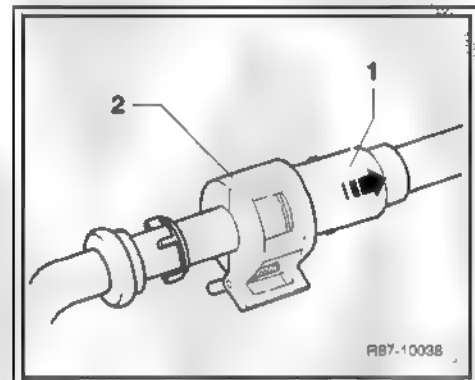




- Place disconnecter -2- in the coupling segment. The cuts on the tool must be in line with the indicators
- Push disconnecter -2- in the direction of -arrow A- into compressor pipes -1- against the stop of coupling -3-

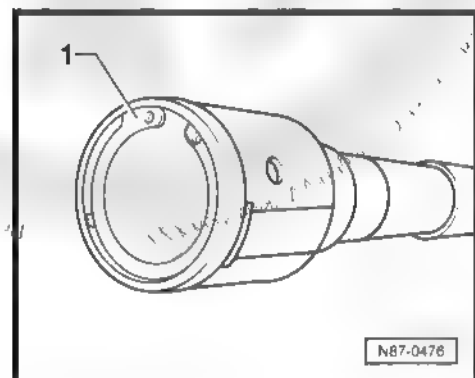


- Hold disconnecter -2- on the stop and pull coupling -1- in the direction of -arrow-.
- After every removal, the sealing ring, locking insert and safety ring must be replaced.

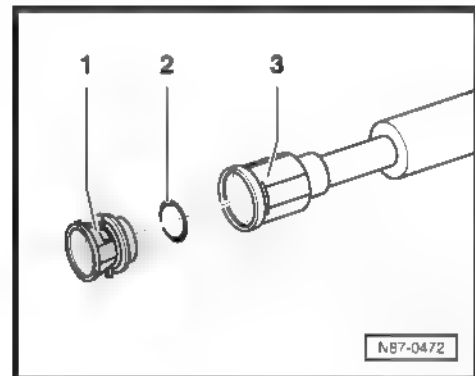


8.9.2 Removing the quick-release coupling components

- Remove the disconnecter and remove lock -1- from the coupling using suitable pliers.



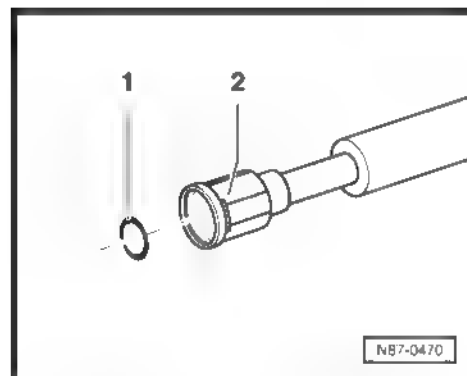
- Remove locking insert -1- and the sealing ring -2- from the coupling -3-.



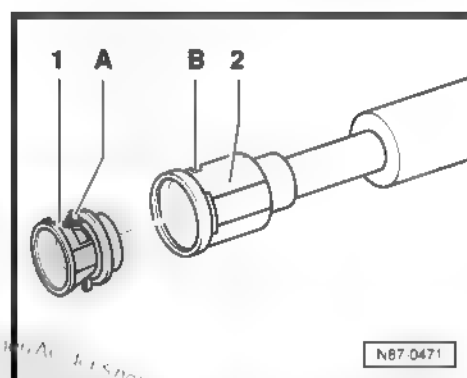


8.9.3 Installing the quick-release coupling components

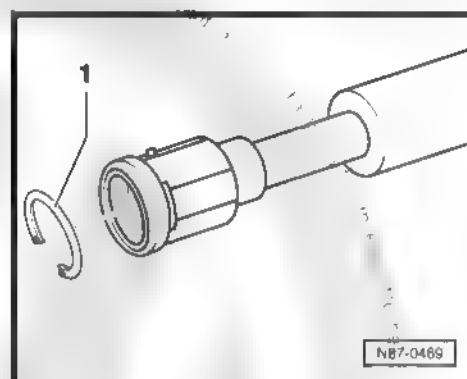
- Dampen the sealing ring -1- with refrigerant oil and insert the sealing ring in the coupling -2- up to the stop.



- Insert the locking element -1- into the coupling -2-. The indicators -A- must be positioned so that they coincide with the holes -B- in the coupling.

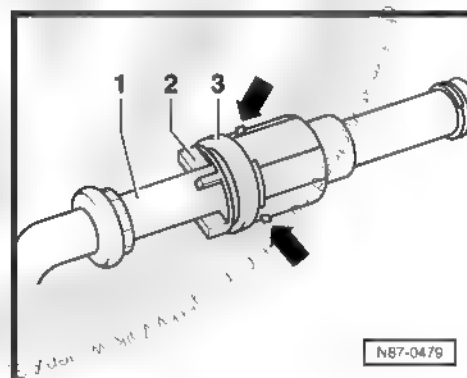


- Install the lock -1- with proper pliers.



8.9.4 Quick-release coupling installation

- Introduce the compressor tubing -1- to coupling -3- of the cooling gas tubing until the indicators are clearly exposed through the holes -arrows-.
- Move the sealing boot -2- to the coupling -3- so that the sealing boot adjusts to the coupling


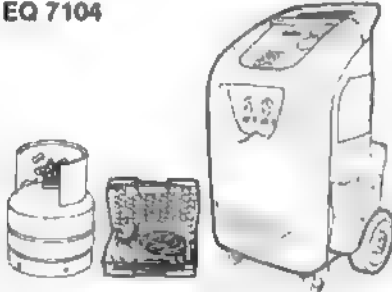
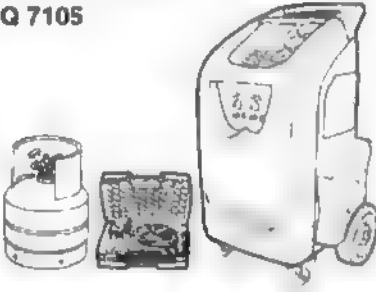





9 Air conditioning system hoses - remove and install

Special tools and workshop equipment required

- ◆ Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7104-
- ◆ Climate control recovery, recycling, refilling, and cleaning set - EQ 7105-
- ◆ Torque wrench - 5 to 50 Nm (enc. 1/2") - VAG 1331-

EQ 7098 	EQ 7104 
EQ 7105 	VAG 1331 
	Q87-10003

The equipment has a quick-release coupling adapter for service connections on both the high and low pressure sides.



Note

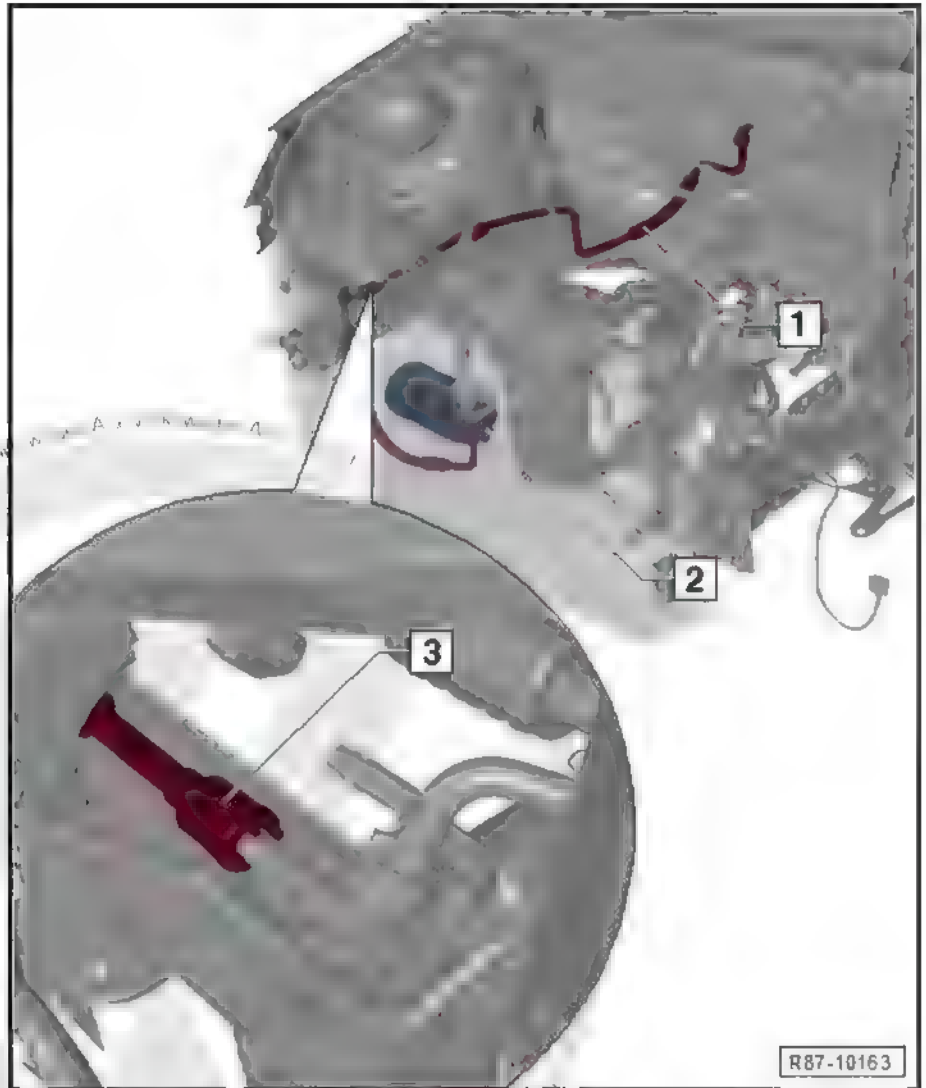
- ◆ *First extract the refrigerant gas with the Climate control recovery, recycling and refill set or VAS 6008 - EQ 7098- or similar equipment ➤ Air conditioning with R134a refrigerant gas; Rep. gr. 00 ; Technical data .*
- ◆ *Environmental contamination by the refrigerant is a punishable offence.*
- ◆ *All cooling gas circuit components that are open must be closed with proper plugs to prevent humidity from entering the components.*

9.1 Air conditioning system low pressure hose - remove and install

Location:



- 1 - Low pressure hose
- 2 - Compressor
- 3 - Quick-release coupling connection



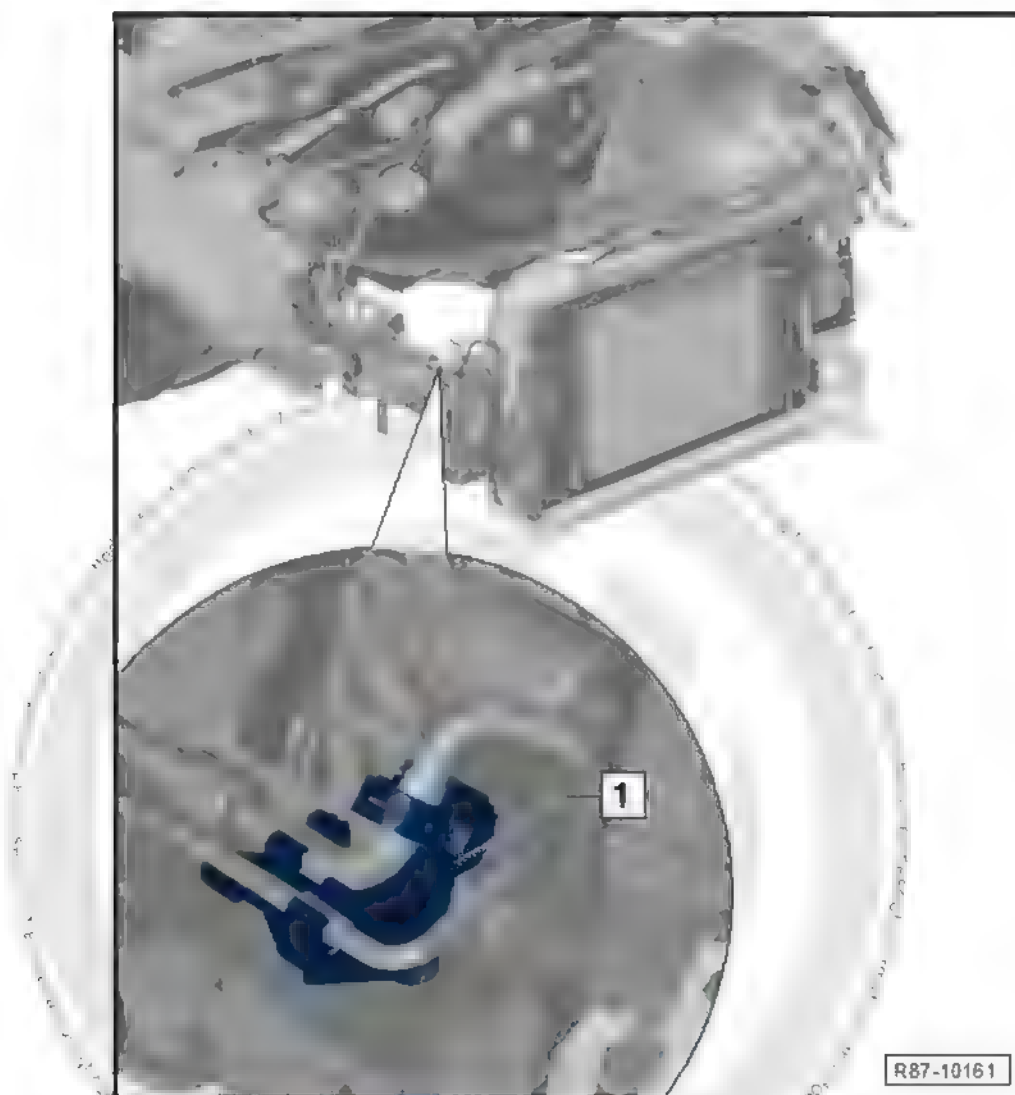
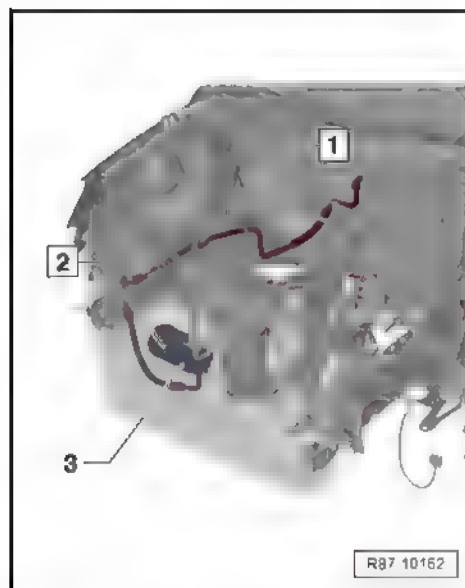
WARNING

When repairing air conditioning hoses, always use connections such as



Removal:

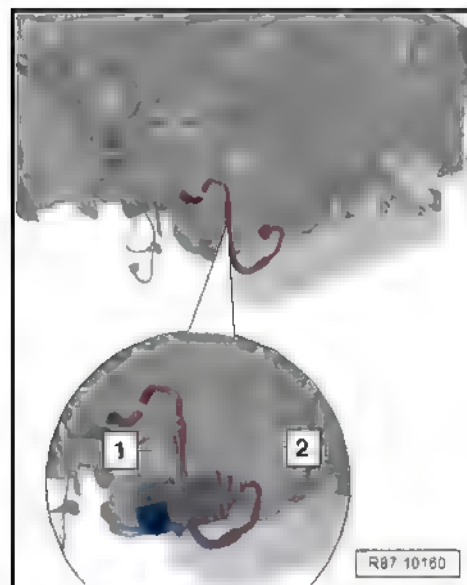
- Release the low pressure hose fastening screw -1- from the air conditioning compressor -2-.
- Move the low pressure hose from the fastening support -1- of the air conditioning hoses.



- Release the quick-release coupling ➤ [page 104](#) .



- Release the low pressure hose connecting part -1- from the air conditioning compressor.

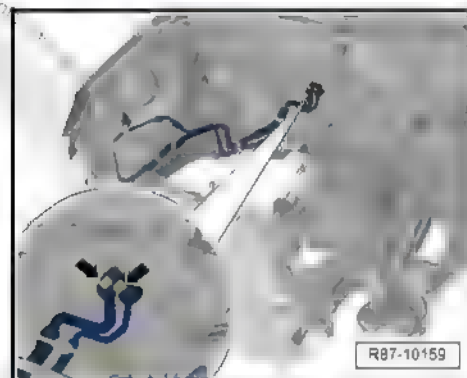


- Release the hose fastening screws -arrows- from the expansion valve.



Note

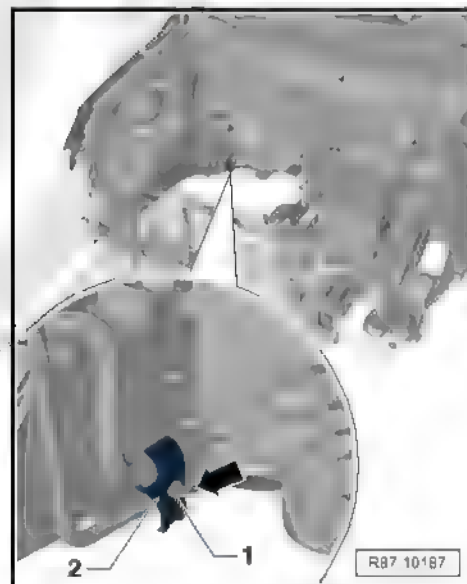
In this case, the high pressure hose fastening screw is removed in order to facilitate movement of the low pressure hose during removal.



- Release the fastening support -2- nut -1- from the air conditioning hoses.
- Remove the air conditioning low pressure hose, using flexible parts to allow its movement within its housing.

Installation:

Installation is performed in reverse sequence to the removal.



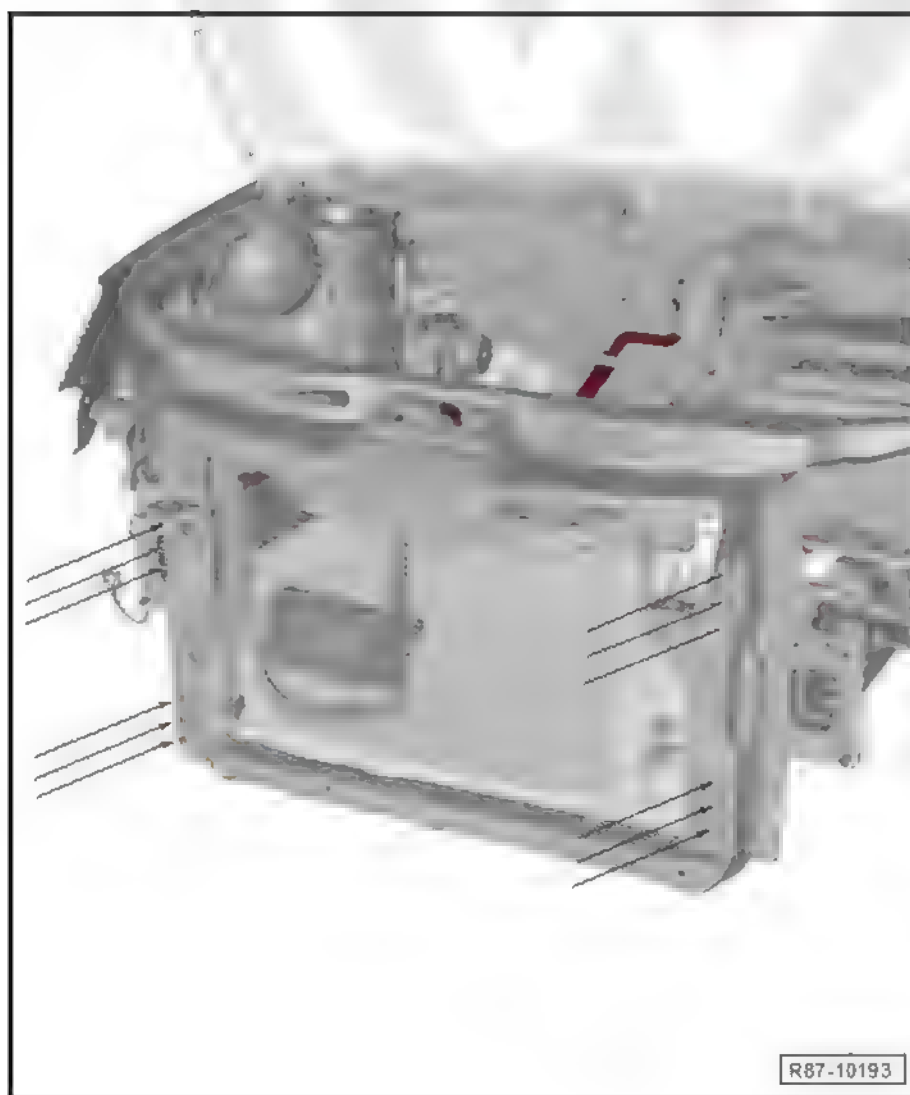
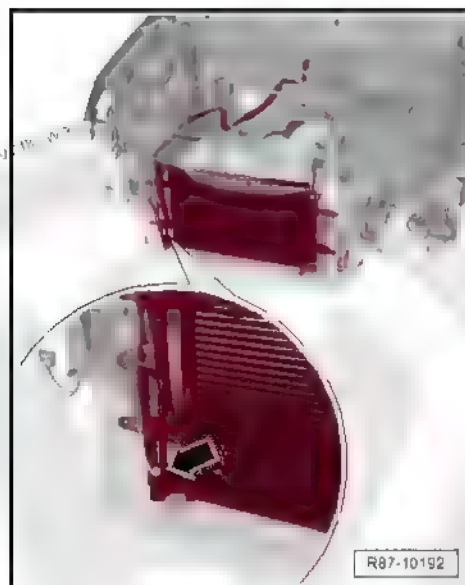
9.2 Air conditioning system high pressure hose - remove and install

Removal:

- Remove the front bumper ➤ Front bumper; Rep. gr. 63 ; Bumper .
- Release the quick-release coupling ➤ [page 104](#) .



- Remove the fastening screw of the high pressure hose connection from the condenser -arrow-.
- Release the radiator screws and move it towards the engine.



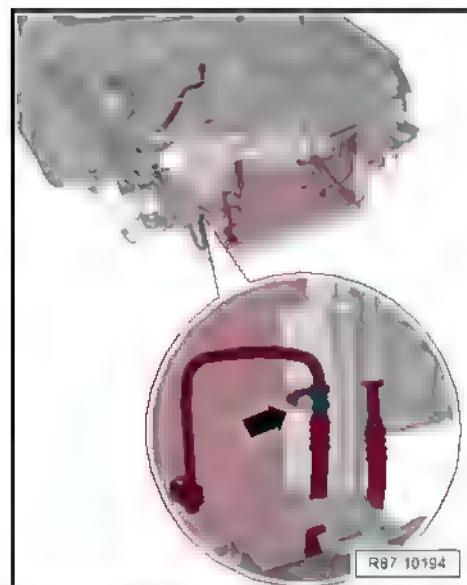


- Remove the screw fastening the high pressure hose to the condenser -arrow-.
- Remove the first part of the high pressure hose by moving the radiator towards the engine in order to clear the area.

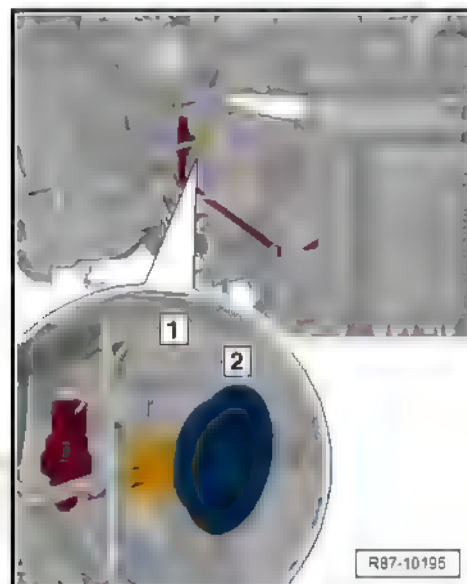


Note

Two collaborators are required for this operation.



- Release the pressure switch connector -1- and the horn connector -2-.



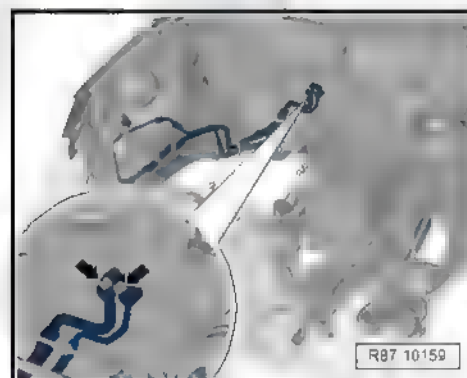
- Release the hose fastening screws -arrows- from the expansion valve.



Note

In this case, the low pressure hose fastening screw is removed in order to facilitate movement of the high pressure hose during removal.

For vehicles with power steering:





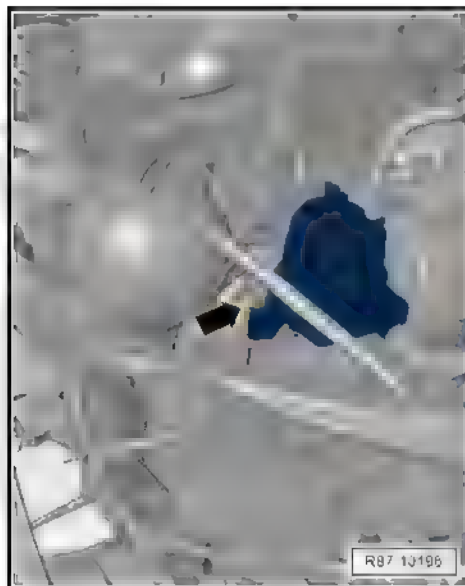
- Release the screw -arrow- and move the power steering tank.

Continuation for all vehicles:

- Remove the air conditioning high pressure hose, using flexible parts to allow its movement within its housing

Installation:

Installation is carried out in the reverse order of removal.

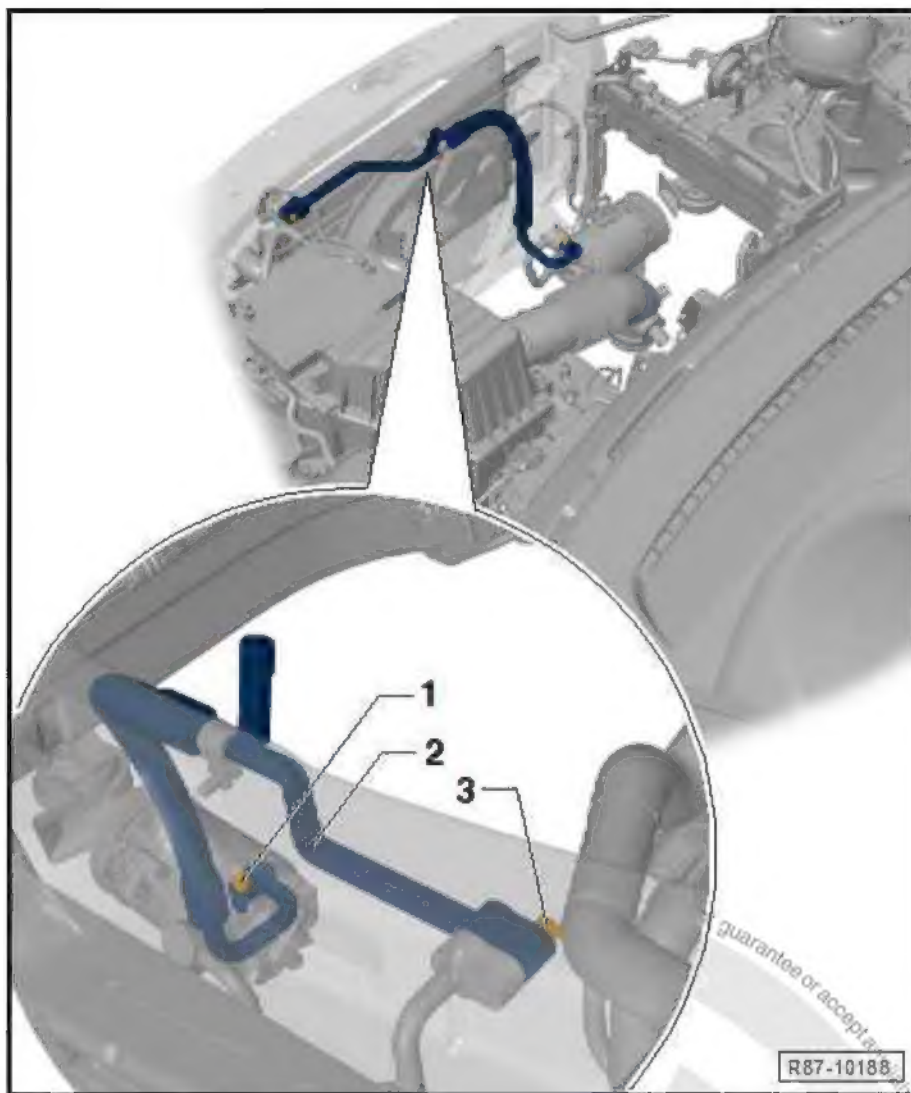


9.3 Condenser compressor hose - remove and install

Location:

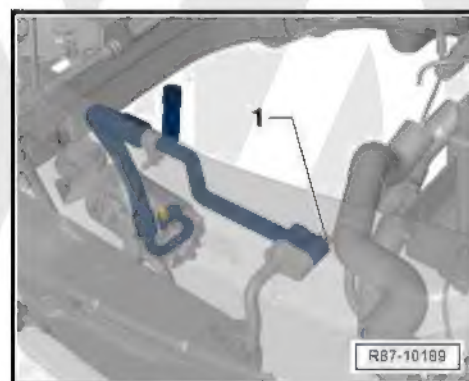


- 1 - Compressor fastening screw
- 2 - Condenser compressor hose
- 3 - Condenser fastening screw



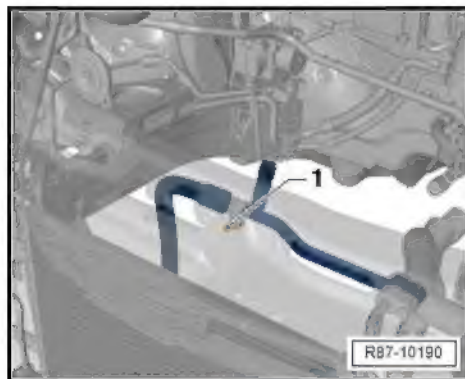
Removal:

- Release the condenser compressor hose fastening screw -1-.





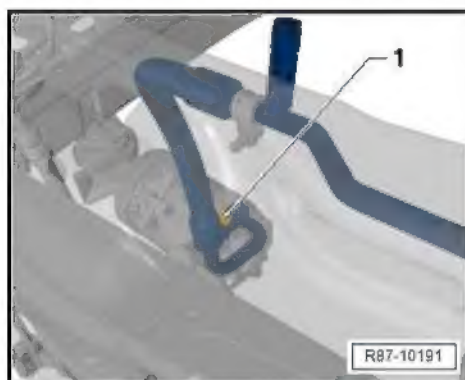
- Remove the fastening screw -1-.



- Release the compressor hose connection fastening screw -1-.
- Remove the condenser compressor hose.

Installation:

Installation is carried out in the reverse order of removal.





10 Filling capacities

10.1 R134a refrigerant gas

Compressor		Filling capacity
2MZ	Delphi	450 ± 25 grams
DV9	Doowon	450 ± 25 grams

10.2 Cooling system oil



Note

A special oil must be used exclusively for R134a refrigerant circuits, and that should not be purchased in stores that sell oil for machines with refrigerant.

The cooling system oil can be purchased under replacement part number		
Compressor		Number for replacement oil
2MZ	Delphi	G 052 154 A2
DV9	Doowon	G 052 154 A2

Compressor			Filling capacity ¹⁾
2MZ	Delphi	5U0 820 803	59.06 in ³
2MZ	Delphi	5U0 820 803 A	59.06 in ³
DV9	Doowon	1S0 820 803 C	120 cm ³

1) This quantity of cooling system oil is contained in the replacement compressor and corresponds to the total filling capacity.

Important information:

Since the cooling system oil is highly hygroscopic, the opened containers must be closed immediately after use, protecting the containers from moisture.

Because of its chemical properties, the cooling system oil must not be discharged along with engine oil or gear oil.

10.2.1 Oil distribution

The oil in the compressor oil sump, before the air conditioning is turned on for the first time, is distributed through the refrigerant circuit at the following rates:

- ◆ Compressor (approx. 30%)
- ◆ Condenser / Dryer filter (approx. 30%)
- ◆ Flexible intake tube (approx. 10%)
- ◆ Evaporator (approx. 30%)



Note

When replacing the compressor, slowly remove the replacement compressor plugs so that the gas used for pressurizing is released. This prevents compressor oil loss.

When replacing the circuit components, correct the quantity of refrigerant oil. Check additional recommendations, related to:

- ◆ Replacing the compressor ⇒ Air conditioning with R134a refrigerant; Rep. gr. 00 ; Technical data .
- ◆ Liquid receiver replacement ⇒ Air conditioning with refrigerant R134a; Rep. gr. 00 ; Technical data .
- ◆ Replacement of other components ⇒ Air conditioning with refrigerant R134a; Rep. gr. 00 ; Technical data .

In case of doubts about the quantity of cooling gas oil in the respective circuit, clean it, and then replenish with the recommended quantity of cooling gas oil ⇒ Air conditioning with R134a cooling gas; Rep. gr. 00 ; Cleaning the cooling gas circuit .

12.11

